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New York State Museum Bulletin

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No. 200 ALBANY, N. Y. August 1, 1917

The University of the State of New York

New York State Museum

John M. Clarke, Director

KEY TO AMERICAN INSECT GALLS

By EPHRAIM PORTER FELT D. Sc.

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THE UNIVERSITY OF THE STATE OF NEW YORK

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The University of the State of New York
Science Department, May 4, 1917

Dr John H. Finley
President of the University

SIR:

I transmit herewith and recommend for publication as a bulletin of the State Museum, the accompanying manuscript prepared by Dr Ephraim P. Felt, State Entomologist, and entitled: *A Key to American Insect Galls*. The manuscript is accompanied by the necessary illustrative material.

Very respectfully yours

JOHN M. CLARKE
Director

THE UNIVERSITY OF THE STATE OF NEW YORK
OFFICE OF THE PRESIDENT

Approved for publication this 10th day of May 1917

Thos. E. Finegan

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KEY TO AMERICAN INSECT GALLS

BY

EPHRAIM PORTER FELT D. SC.

INTRODUCTION

Insect galls are obvious and frequently excite surprise because of the strange form or the wonderful coloring and delicacy of structure. The fresh, well-developed gall of the wool sower is one of the most beautiful of natural objects, while the delicately colored galls of Itonida anthici on bald cypress may occasionally be found in such numbers as to suggest a beautiful group of dainty flowers, structures very different from what normally occur on this tree and therefore even more surprising. The great variety of galls found upon the oaks and the interesting alternation of generations characteristic of the gall wasps challenge our admiration and incite to further study. The same is true though possibly to a less marked degree, of the hosts of fragile gall midges, forms which have learned to subsist upon various portions of a very large number of plants and, like the gall wasps, offer many biological puzzles to stimulate the earnest inquirer. Much of this is also true of the gall-making plant lice with their migrations and very dissimilar alternate host plants.

The origin and development of these growths are no less interesting than the deformities themselves. The gall-making habit among insects has undoubtedly developed independently in several widely

separated groups and must have originated in a mutual reaction between the insects and their host plants, which has reached its climax in the many apparently inexplicable deformations of the present day. All stages of the process may be observed among the gall midges, some of which live among succulent fungous growths and either feed a little upon the fungi or obtain nourishment by absorption from the humid surfaces of the host. There are certain predaceous maggots in this group which have the mouth-parts greatly prolonged and apparently specially adapted to withdraw by suction the body fluids of their hosts. It may be one or the other or possibly a combination of the two methods which obtains among the fungivorous species. It is only á step from this to absorption with apparently no mechanical injury as in the leaf spot gall of the soft maple or the pod leaf galls mentioned below. The habit once started, it is possible to understand how the process might continue with infinite variations among a host of species, which is just what has taken place. The adaptations have continued along a number of lines to such an extent that many insect galls give little external evidence of their origin. Gall insects live at the expense of their hosts and in some instances, at least in the case of certain plant lice, the mere satisfying of the primitive instinct of hunger seems to be all that is necessary, not only to preserve life but to compel or cajole, as it were, the host plant, to grow or throw around its enemy a defensive barrier of gall within which the aphid may live in the presence of abundance, be comparatively safe and obtain like conditions for its numerous progeny. This sheltered, luxurious type of existence appears to be essential to many species and the tendencies along these lines have developed to such an extent that twenty-nine species of gall-making aphids, Phylloxera, are known to live at the expense of our hickories and in a similar manner a number of species of jumping plant lice, Pachypsylla, subsist on hackberry.

A very large proportion of insect galls begin growth in the bud and therefore at a time when the plant tissues are plastic and more easily modified. Not a few of the strange forms are to be explained as the arrested development of buds, fruit or leaves as the case may be, frequently accompanied by an excessive development or swelling of parts immediately adjacent to the source of irritation. This latter may be brought about by fluids in the egg or injected with it, as in the case of the galls of certain sawflies which become full size before the larvae hatch. Sometimes it is a reaction between the contents of the egg or larva and adjacent tissues through excretion or osmosis, a condition which must obtain in the familiar pod galls

caused by the deformation of ash and spiraea leaves and showing no trace of mechanical abrasion or injury. Then there are numerous galls which develop as a result of continued stimulation by the gall maker itself, a relation evidenced by the fact that in the case of the beaked willow galls producing parasites, we find mostly partly developed galls which present marked differences from those containing healthy maggots.

This key to American insect galls is an outgrowth of earlier studies of the gall midges and was assembled primarily to facilitate the identification of the numerous galls submitted for name. It gives for the first time, for American forms, a comprehensive survey of the curious plant growths caused by insects and their near allies, the plant mites. With such a guide many amateurs will doubtless be encouraged to enter a charming and delightful field of study, one which may be followed with profit for the child at school as well as by the student of more mature years. The specialist will find herein references to the best accounts of the numerous species listed as well as a summary of American literature, while the many records of host relationships can not be ignored by the biologist and ecologist. The obvious concentration of many forms upon relatively few host plants, especially those with numerous closely allied species, such as the willows, oaks and goldenrods, and the great diversity of both structure and food habits among gall midges, all suggest interesting lines of study. These relationships are brought out more clearly in a tabulation of the hosts and galls (see page 215), where 1441 species are listed, 682 being gall midges and 445 gall wasps. The remainder of the plant deformations discussed in this work are produced by a few of the other two-winged flies or Diptera, four-winged flies or Hymenoptera, beetles or Coleoptera, moths or Lepidoptera, and the true bugs or Hemiptera, especially the plant lice and the plant mites or Eriophyidae, the last being represented by 161 species. The deformations, though numerous, by no means exhaust the possibilities and in the estimation of Mr L. H. Weld, a student of the Cynipidae, nearly one-third, mostly inhabitants of inconspicuous galls, are still unknown. It should also be remembered that extensive regions are comparatively unexplored for insect galls of all kinds.

There are not only a large number of different species of gall insects but occasionally some become exceedingly abundant; for example, there was, a few years ago, near Albany, a large oak with its smaller branches almost covered with the giant, beadlike swellings of the gouty oak gall, Andricus punctatus (fig. 57),

and on rearing the gall wasps from a few twigs it was estimated that over 500,000 insects were then living at the expense of the one tree. Last summer the galls of Andricus gemmarius were so numerous on a large pin oak near Newton, N. J., that the sweet exudation from the deformations attracted hosts of bees and flies. The unusual noise, humming or "roaring" of these insects resulted in an examination which showed the large tree to be generally infested. The twig illustrated in figure 59 gives an idea of the abundance of the galls. Among gall midges the well-known Hessian fly frequently becomes numerous enough to destroy extensive areas of wheat; the Sorghum midge and the clover midge make it nearly impossible to grow the seed of these plants in certain sections, while the rose midge, the violet midge and the chrysanthemum midge are greenhouse species known only too well to the grower of these highly cherished flowers.

The collection and study of plant galls is a field open to many. The specimens are to be found at all times of the year and those with woody tissues require no special preparation if one desires to make a collection. It is not difficult in numerous instances, especially if collecting is deferred until the gall insects are nearly mature, to rear the producers, though some care is necessary to distinguish between the true gall makers and the very similar inquilines, or particularly in the case of gall midges, between gall makers and other frequently associated enemies. Gall insects are small, fragile, and can not be studied successfully without a good microscope, considerable technical skill and a moderately good collection and library.

Insect galls may be defined as vegetable excrescences resulting from insect activities and usually sheltering the immature stages of the producers, though a wide acquaintance with these growths demonstrates the existence of innumerable gradations between the apparently normal and the decidedly abnormal and, as a consequence, it is difficult to establish a satisfactory distinction between insect galls and deformations not worthy of classification under this term. Some would include the mere curling of leaves and while to a certain extent this is justified, in most cases unless the curling is pronounced the deformation has not been considered as a gall coming within the scope of this work.

The two most important groups of gall insects — the gall midges or the Itonididae, and the gall wasps or the Cynipidae — each contain species living at the expense of plants and producing little or no swelling of the plant tissues. In the former group there

are to be found species, the young or the maggots of which live exposed upon the foliage, some of these evidently absorbing nourishment from the leaf tissues and producing a characteristic modification, such for example as the very common leaf spot caused by Cecidomyia ocellaris on soft maple leaves; others subsist upon fungi, some are predaceous, and the young of a number may be found in decaying wood or in subcortical tissues of the host and cause little or no disturbance of the plant functions. Such species are very likely to be reared by the student of insect galls and we have therefore included in the key a number of these forms which have been definitely associated with various food plants.

A comparison of the food habits of the gall midges or Itonididae and the gall wasps or Cynipidae is of more than passing interest. In the first place, the 682 galls produced by the midges occur on plants belonging to 69 botanical families and 202 genera. The larvae of 66 species live at the expense of the willows or Salicaceae (52 of these are found on Salix); 29 species occur upon the Juglandaceae, all but one infesting hickory or Carya; 43 attack the Fagaceae (36 of these being upon the oaks); 56 species produce galls on the Rosaceae, 24 on the Leguminosae, 22 upon the Vitaceae, and 151 on the Compositae. The most obvious concentration of species, aside from those mentioned above, is the 44 midges reared from Solidago and the 22 found upon aster. These figures are approximate, yet taken in connection with the great diversity in the structure of these small insects, indicate that this group has been able to maintain itself upon a great many different plants through a considerable physiological adaptability and that the distinctness of the species has been established by relatively small modifications in structure.

The gall wasps or Cynipidae present an entirely different condition so far as relation to the flora is concerned. They attack plants referable to only 6 botanical families and assignable to but 17 plant genera.[1] There is, however, a most striking concentration in food habits, since a very large proportion of the 445 gall makers subsist at the expense of the Fagaceae which, for this group, means the oaks, the exact number in our list being 359 though this figure, like the above, is an approximation; 38 species have been reared from members of the rose family or Rosaceae, 28 (Rhodites) living at the expense of the genus Rosa. The other species referable to the Cynipidae are scattered in their food habits, the most evident concentration, and this far from marked, being the 12 species reared

[1] Mr L. H. Weld has called our attention to two undescribed gall wasps which would change the above figures to 7 botanical families and 19 plant genera. There is also a South American species on Acacia.

from various Compositae, the genera Silphium and Lactuca supporting 4 and 3, respectively. This well-defined limitation in food habits is accompanied, as might be expected, by a high degree of specialization in structure.

The plant lice or Aphididae live on a great variety of plants, though the gall-making forms occur upon the members of relatively few plant families and genera, the most evident food preference being in the gall aphids belonging to the genus Phylloxera, with its 29 species producing deformations on hickories. The nearly allied jumping plant lice or Psyllidae present a similar condition in the genus Pachypsylla and its relation to the numerous galls upon Celtis.

It will be seen by referring to the key that the galls are grouped by food plants and that in the case of those infested by numerous gall insects, additional divisions are made according to the location on the plant and the structure of the galls. The difference between the leaf and twig gall is not sharply defined in nature, since the same species may produce a gall diverting only a portion of the nourishment and a part of the leaf is therefore clearly present, while in other cases the deformation may develop to such an extent that there is no hint of a leaf and the gall is apparently, at least, a twig deformation; consequently some galls are entered more than once because of an apparently different origin and the same is true to a certain extent in regard to variations in form.

A few special terms used in the key are explained below:

Blister galls. This is applied primarily to the blisterlike, apparently fungous-filled swellings occurring upon the leaves of Solidago and aster and usually inhabited by species of Asteromyia.

Bud galls. Deformations which evidently originate from buds. They may vary from a plainly aborted bud to a great enlargement developing from such parts.

Bullet galls. A term which has become somewhat general and refers in particular to the nearly solid, monothalamous bullet galls produced by certain species of Disholcaspis upon oak twigs.

Cecidomyia. A term used here in a broad sense and applied to any species referable to the family Itonididae and which can not be readily assigned to more closely defined genera.

Erineum is applied in a general way to the hairy growths upon leaf surfaces inhabited by species of plant mites or Eriophyidae.

Flower galls. Deformed flowers or masses of flowers, frequently more or less variable in shape.

Fruit galls. This term is limited to species inhabiting the seeds or fruits and in some cases producing marked deformities.

Leaf galls. The term is a broad one applying to all deformations definitely associated with leaves.

Leaf spots. A descriptive term which has been adopted for some leaf galls which are more evident because of the marked discoloration than on account of size or elevation.

Monothalamous. Literally, one chamber; a convenient term used to designate galls inhabited by a larva or larvae in one cell or cavity.

Oak apples. A general term applied to the familiar, large galls on oak produced by the genus Amphibolips and referring in particular to the large oak apple and the empty oak apple.

Pouch galls are simply pouchlike deformities usually caused by a depression in the leaf surface eventuating in a pouchlike cavity, such, for example, as that inhabited by a number of gall mites.

Root galls is a term applied to any swellings upon roots.

Rosette galls are simply a specialized type of bud gall with the central cell or cells surrounded by a rosette of partly developed leaves.

Stem or twig galls are deformations restricted to that portion of the plant.

Subcortical galls are swellings just under the bark and usually occurring upon one side of a twig or stem.

It is frequently very convenient to be certain of the group to which the gall maker belongs and the following abbreviations are used in the key.

Acarid. An abbreviation for Acarina and in this work refers particularly to the gall mites or Eriophyidae. The galls produced by this group vary from a simple erineum to a more or less modified pouch gall and are most easily recognized in many cases by the abnormally developed plant hairs and the orifice usually guarded by a fuzzy growth. The presence of extremely minute, four-legged mites is characteristic of these deformities.

Aphid. An abbreviation for Aphididae or plant lice and in this work applied to the gall-producing forms. Aphid galls are most easily recognized by the more or less distinct orifice and the characteristic inhabitants.

Coleop. An abbreviation for Coleoptera or beetles, the gall-making larvae of which are legless or nearly so and characterized by the possession of a head and well-developed jaws.

Itonid. An abbreviation for Itonididae or gall midges, a group

which produces an immense number of galls — sometimes closed and sometimes partly open — and most easily recognized by the yellowish or white maggots with a more or less developed Y-shaped "breastbone" and a distinct head.

Cynipid. An abbreviation for Cynipidae or gall wasps and also used as a convenient designation for species not referable to well-defined genera. The group is remarkable because of its producing a large number and variety of closed galls, especially on oaks, the larvae being in individual cells imbedded in the plant tissues, headless and white.

Dipt. An abbreviation for Diptera or the true flies and used in this work where the more restrictive term Itonid can not be employed. The young are headless, legless, usually white maggots. The galls vary greatly in shape and structure.

Hemip. An abbreviation for Hemiptera or true bugs which includes a number of species not referable to the more closely limited term Aphididae or plant lice. The galls are variable in appearance.

Hym. An abbreviation for Hymenoptera or members of the wasp and bee family and in this work applied especially to those not included under the term Cynipidae. The Nematid larvae are false caterpillars with numerous legs and a conspicuous head. The young of the Chalcids are white and without head or legs. The galls are variable in appearance.

Lepid. An abbreviation for Lepidoptera or the butterflies and moths. The young or caterpillars of the latter inhabit a number of galls and may be distinguished from other gall insects by the well-developed head and the presence usually of both true and abdominal legs.

There is no reason why many galls should not have well-recognized common names. The writer has taken pains to use all those worthy of perpetuation and, in addition, following suggestions from various sources, has incorporated in the key a number of vernacular terms, some of which at least, it is hoped, will become current.

The abbreviated references following the description of the gall give, first, the name or an abbreviation of the name of the author, second, the year of publication (in case there is more than one in a year they are distinguished by letters) and, third, the page. These citations are given in full in the bibliography.

The nomenclature used is that current at the time the manuscript was completed, though a recent work: "The Type Species of the Genera of the Cynipoidea or the Gall Wasps and Parasitic Cynipoides" by S. A. Rohwer and Margaret M. Fagan (U. S.

National Museum Proceedings 53:357–80, 1917) indicates that a change must be made in several of the best known Cynipid genera, namely, that Cynips of authors not Linnaeus is Adleria Rohw. and Fag., Dryophanta Forst. is Cynips Linnaeus and that Rhodites Hartig and Diplolepis Goeff. are synonyms. In view of the fact that the above genera are so well known and have been so generally used in literature, it was considered best to continue these names in this key, since it would be decidedly more convenient for those wishing to refer to earlier accounts.

Certain insect galls are commercially valuable and on looking into the matter one may be surprised at the important place they hold in trade. It is well known that some oak galls have long been used in the manufacture of ink, particularly the more permanent writing fluids. The amost important gall for this purpose is the Eurasian Cynips gallae-tinctoriae, variously known as the Aleppo gall, Turkey gall, Levant gall, gall nut, gall of commerce and ink marble. This gall contains 65 per cent of tannic acid and is mostly used for dyeing wool and skins. The Knoppern or acorn gall, produced by Cynips quercus-calycis contains 50 per cent tannic acid and is next in importance to the Aleppo gall. There is a Chinese sumac gall produced by a species of Pemphigus, closely allied to the American P. rhois, that is imported in considerable quantities because of its high tannin content, a characteristic also of our native gall. The air dried Chinese gall contains over 60 per cent tannic acid and our native sumac gall about 8 per cent less. It is probable that a number of American oak galls in particular could be utilized to advantage. Insect galls are used in medicine on account of their astringent properties and a few have served as articles of food, notably that of a species of Aylax on Salvia pomifera which forms an article of commerce in the Near East and a somewhat common catmint gall, Aylax glechomae. Both are said to have an agreeable taste and the sweet odor of the host plant. The producer of the latter has become well established in this country. Other galls are known to be edible and it is possible that they could be turned to good account when the insects are unusually abundant. There is a record of a black oak gall somewhat resembling wheat and provisionally referred to the genus Callirhytis being so abundant in Missouri and Arkansas some years ago that it was fed to various domestic animals with excellent results. One gall, that of Cynips theophrastea, was used by Greeks as a fuel in lamps. For an excellent historical account of the use of insect

galls, the reader is referred to a recent article by Miss Fagan cited in the bibliography.

Through the courtesy of the officials of the American Museum of Natural History we have been allowed to use the magnificent series of Beutenmueller illustrations of certain Cynipid galls, and by arrangement with the executor of the will of the late S. Millett Thompson of Providence, R. I., we were at liberty to reproduce figures from the original photographs used in the Illustrated Catalogue of American Insect Galls by the late Dr Millett Taylor Thompson. The late Cora H. Clarke of Boston, Mass., well known as an enthusiastic student of insect galls, kindly placed at our disposal a number of excellent illustrations, and with the consent of Mr L. H. Weld of Evanston, Ill., we have reproduced a number of his admirable photographs. Miss Fannie A. Stebbins, Springfield, Mass., has loaned the use of several illustrations. These and the approximately two hundred original line drawings and a number of illustrations appearing in earlier publications of the office are also incorporated in this work, the whole making an unrivaled series in the literature of American insect galls.

KEY TO AMERICAN INSECT GALLS

Polypodiaceae (ferns)

Cystopteris fragilis (bladder fern)

Root gall (Cosens, in litt. May 3, '15)

Itonid. Cecidomyia sp

Ephedraceae

Ephedra trifurca

Fusiform twig gall, length 12 mm. Fig. 1. Ckll. '98, p. 327

Itonid. Lasioptera ephedrae Ckll.

Irregular, subcortical, resinous gall. Ckll. '02, p. 184

Itonid. Lasioptera ephedricola Ckll.

Fig. 1. Lasioptera ephedrae Ckll., showing two galls, one in section. (Original)

Fig. 2. Gouty pine midge, Retinodiplosis inopis O. S. Typical enlargement of twig. (Original)

Pinaceae (pines)

Pinus (pine)

Reared from fungous affected heartwood, P. rigida. Felt '13m, p. 191

Itonid. Monardia lignivora Felt

Reared from Scolytid galleries in pine. Felt '13m, p. 188

Itonid. Monardia pinicorticis Felt

Reared from bark of P. virginiana. Felt '07e, p. 23

Itonid. Winnertzia pinicorticis Felt

Subcortical twig swellings with pitch exudations, resinous cocoons on needles of P. rigida. Fig. 2. Felt '12h, p 368

Itonid. Gouty pitch pine midge, Retinodiplosis inopis O. S.

Spherical or ovoid twig swellings, length 6 to 18 mm, on hard pine.
Coleopt. Pine gall weevil, Podapion gallicola Riley
Irregular, subhemispheric or oval, eccentric twig swellings, length 1.5 to 3 cm, diameter 1 to 2 cm, on P. taeda. Fig. 4.
Itonid. Retinodiplosis sp. a2 12
Reared from resin masses on P. strobus. Felt, '18d, p. 382, 383
Itonid. Banded pitch midge, Retinodiplosis albitarsi Felt
Itonid. Mycodiplosis packardi Felt

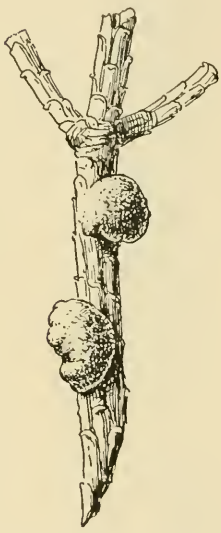

Fig. 3. Pitch midge, Retinodiplosis resinicola O. S. Typical pitch exudations. (Original)

Fig. 4. Retinodiplosis sp. Scars on Pinus taeda, probably the work of a midge. (Original)

Reared from extruded resin masses on P. rigida. Fig. 3. Felt '06b, p. 410
Itonid. Pitch midge, Retinodiplosis resinicola O. S.
Reared from extruded resin masses on P. radiata. Wlms. '09, p. 1
Itonid. Western pitch midge, Retinodiplosis resinicoloides Wlms.
Reared from pitch masses on long leaved pine, P. palustris. Felt '15h, p. 408
Itonid. Southern pitch midge, Retinodiplosis palustris Felt

A subglobose terminal swelling involving the tip of the new growth of P. edulis, diameter 5 mm. This kills the apical needles, though the lower ones continue to develop, and in old deformities may produce a ring of short, stout, upstanding needles surrounding a central dead area. Larvae pale orange.

Itonid. Cecidomyia sp. a2823

Apical budlike swelling, diameter 1 cm on P. scopulorum. Figs. 5, 6. Felt '12f, p. 240

Itonid. Pine bud gall, Contarinia coloradensis Felt

Same gall as above. Felt '11k, p. 549

Itonid. Dicrodiplosis gillettei Felt

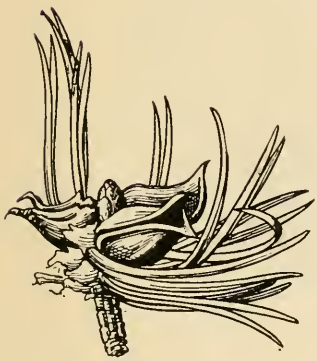

Fig. 5. Pine bud gall, Contarinia coloradensis Felt. Three galls. (Original)

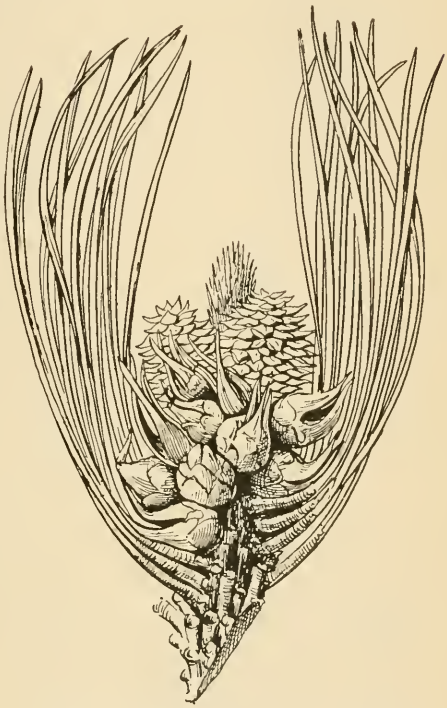

Fig. 6. Pine bud gall, Contarinia coloradensis Felt. Cluster of galls on P. scopulorum. (Original)

Aborted needle clusters, base subglobose. On P. rigida. Fig. 7. Felt '06b, p. 423

Itonid. Pine needle gall, Cecidomyia pinirigidae Pack.

Globose swellings at base of needles of P. edulis, diameter 4 mm, the aborted needles with a length of 1 to 3 cm, the walls thick. Felt, '18d, p. 381

Itonid. ?Thecodiplosis cockerelli Felt

Elongate, cylindric or fusiform green or purplish-red swellings at the base of the needles of P. edulis, length 1.5 cm, diameter 3 mm, the walls moderately thin and with a large cavity containing several larvae. Occurs also on P. monophyllus (a2857)

Itonid. Cecidomyia sp. a2821

Kidney shaped enlargements at base of needles of P. edulis, length 7 mm, diameter 4 mm, the walls thick and the needles rudimentary. Fig. 8.

Itonid. Thecodiplosis cockerelli Felt

Globose swelling at base of needles on P. virginiana. Fig. 11. Felt '12e, p. 148

Itonid. Janetiella coloradensis Felt

Base of needles of P. radiata. Snow and Mills '00, p. 489

Itonid. Western pine needle gall, Thecodiplosis piniradiatae Sn. & Mlls.

Picea (spruce)

Green or brown, polythalamous, conelike swellings on Norway spruce. Fig. 9. Felt '06b, p. 189

Aphid. Spruce cone gall, Chermes abietis Linn.

Fig. 7. Pine needle gall, Cecidomyia pinirigidae Pack. Typical swelling at base of the leaf. (Original)

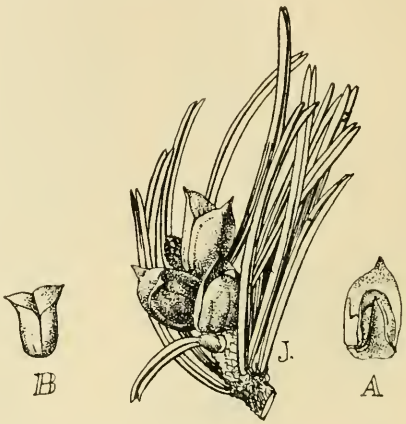

Fig. 8. Thecodiplosis cockerelli Felt. Deformed needles of P. edulis. (Original)

Green or brown, polythalamous, produced, conelike swelling on Colorado blue spruce, length 5 cm, diameter 2.5 cm. Pl. 14, fig. 1. Felt '11m, p. 37

Aphid. Long spruce cone gall, Chermes cooleyi Gill.

Abies (fir)

Reared from seeds. Fig. 10. Felt '15e, p. 162

Itonid. Fir seed midge, Dasyneura canadensis Felt

Infertile seed of Douglas fir. Crosby '09, p. 379

Hym. Fir seed wasp, Megastigmus spermotrophus Wachtl.

Apical bud gall. Pl. 5, fig. 9. Felt '14j, p. 77

Itonid. Spruce bud midge, Rhabdophaga swainei Felt

Bud galls and swellings at base of leaves. Felt '07a, p. 123

Itonid. Spruce gall midge, Phytophaga tsugae Felt [1]

[1] Probably occurs on hemlock also.

Subglobular basal swellings of leaves, length 3 mm on balsam. Pl. 7, fig. 1. Lintn, '88, p. 60

Itonid. Balsam gall midge, Cecidomyia balsamicola Lintn.

Tsuga (hemlock)

Larvae in Melanophila galleries. Felt '13h, p. 214

Itonid. Hemlock bark midge, Camptomyia tsugae Felt

Fig. 9. Spruce cone gall, Chermes abietis Linn. Normal type of gall. (Author's illustration)

Fig. 10. Firseed midge, Dasyneura canadensis Felt. Infested cone. (Origina')

Taxodium (bald cypress)

Irregularly globose, thick-walled, somewhat spongy, modified seeds in cones diameter 5 to 7 mm. Fig. 12. Felt '16g, p. 415

Itonid. Cypress seed midge, Retinodiplosis taxodii Felt

Fig. 11. Janetiella coloradensis. Felt. Deformed needles of P. virginiana. (Original)

Fig. 12. Cypress seed midge, Retinodiplosis taxodii Felt. Deformed cone and seeds. (Original)

Fusiform twig gall, length 1.25 cm. Felt '12f, p. 242

Itonid. Cypress twig gall, Thecodiplosis ananassi Riley

Whitish, flower-shaped, fungoid gall. Fig. 13. Felt '13i, p. 278

Itonid. Cypress flower gall, Itonida anthici Felt

A conical, globular or elongate deformation of the leaf. Felt '11k, p. 556

Itonid. Cypress leaf gall, Itonida taxodii Felt

Chamaecyparis (white cedar, cypress)

Bud gall, quadrangular in section, the size larger than the normal bud, densely imbricate and containing a narrow cell inhabited by a reddish larva. Mex. Trotter '11, p. 122

Itonid. White cedar bud gall, Cecidomyia sp.

Reared from seeds of C. lawsoniana Felt '17, p. 194

Itonid. Janetiella siskiyou Felt

Fig. 13. Cypress flower gall, Itonida anthici Felt. Cluster of flower-like galls and one gall enlarged. (Original)

Fig. 14. Juniper rosette gall, Cynips sp., a2602, enlarged. (Original)

Thuja (arbor vitae)

Bud gall

Itonid. Arbor vitae bud gall, Rhopalomyia sp.

Leaf deformation covered with eggs and cast skins. Parrott '06, p. 288

Acarid. Eriophyes thujae Garm.

Juniperus (juniper)

Reared from slightly enlarged fruit of J. californica, J. monosperm um and also from a conical, purplish, apical bud gall, with three or four diverging lobes when mature, length 1 cm, diameter 3 mm

Itonid. Juniper berry midge, Walshomyia juniperina Felt

Fig. 15. Juniper berry wasp, Chalcid sp., a2603. Deformed berries enlarged. (Original)

Deformed infertile fruit of J. pachyphlaea, the interior corky, brown. Econ. Ent. Jour. 11:149 Acarid. Eriophyes ramosus Hodgk. a2858

Apical, reddish, conical gall on J. utahensis. Felt '12e, p. 148

Itonid. Juniper cone gall, Oligotrophus betheli Felt

Reared from same gall

Itonid. Arthrocnodax sp.

Deformed, infertile berries of J. scopulorum. Fig. 15.

Hym. Juniper berry wasp, Chalcid sp. a2603

Flowerlike, apical, greenish brown or pinkish deformations composed of four reflexed and slightly thickened leaf scales on J. scopulorum. Fig. 14.

Cynipid. Juniper rosette gall, Cynips sp. a2602

Thickened, slightly reflexed reddish-brown leaflets of last year's growth on J. scopulorum, possibly an older stage of the preceding.

? Itonid. ? Cecidomyia sp.[1] a2827

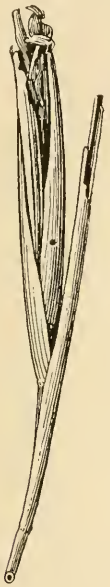

Fig. 16. Wheat joint worm, Isosoma grande Riley. Infested stem. (Original)

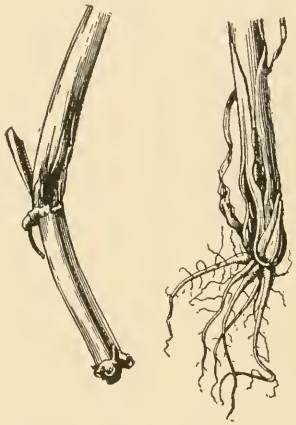

Fig. 17. Hessian fly, Phytophaga destructor Say. Infested stems showing pupae. (Author's illustration)

Prickly burrlike bud galls with numerous short, nearly straight leaves, none reflexed, diameter .5 cm. Felt '18d, p. 380

Itonid. Allomyia juniperi Felt

Apical rosette gall, diameter 1.5 cm, greenish (brown when old) with a variable whitish pubescence, leaf bracts reflexed

Itonid. Cecidomyia sp. a2814

Globose twig enlargement showing a gelatinous growth in June, diameter 3 cm.

Fungus. Cedar apple, Gymnosporangium globosum

Sabina sabinoides (wild Texas or mountain cedar)

Reared from bud gall. Felt '16, p. 30

Itonid. Mountain cedar midge, Walshomyia texana Felt

[1] Epitetrasticus silvae Girault was reared in large numbers.

Gramineae (grasses)

Reared from grass. Felt '11j, p. 461
Itonid. Neolasioptera squamosa Felt

Triticum (wheat)

Reared from pinkish larvae on roots (C. N. Ainslie)
Itonid. Lestremia sp.
Inhabiting stems. Fig. 16. Howard '95, p. 9
Hym. Wheat joint worm, Isosoma grande Ril.
Deformed leaf sheathes. Pl. 4, fig. 6. Doane '16, p. 398
Hym. Wheat-sheath joint worm, Isosoma vaginicolum Doane
Collected on wheat. Howard '95, p. 15
Hym. Wheat joint worm, Isosoma websteri How.
Stems bored and discolored. Comst. '90, p. 127
Hym. Wheat stem sawfly, Cephus pygmaeus Linn.
Infesting stems at the uppermost node. Coq. '98, p. 74
Dipt. Wheat stem maggot, Oscinis carbonaria Lw.
Boring wheat stems. Webst. & Reeves '10
Hym. Western grass-stem sawfly, Cephus oc identalis Ril & Marl.
Under the leaf sheath. Fig. 17. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say
Probably the same as the preceding
Itonid. Cecidomyia culmicola Morr.
Associated with the above. Fitch '61, p. 831
Itonid. Cecidomyia inimica Fitch
Associated with th above. Fitch '46, p. 285
Itonid. Lestodiplosis graminis Fitch
Under the leaf sheath. Coq. '98, p. 70.
Dipt. Chlorops proxima Say
Reared from wheat heads. Felt '12g, p. 289
Itonid. Wheat midge, Itonida tritici Felt
Reared from wheat heads. Felt '12g, p. 287
Itonid. European wheat midge, Thecodiplosis mosellana Gehin
Reared from wheat heads. Felt '12g, p. 288
Itonid. Prodiplosis fitchii Felt

Eriocoma cuspidata

Inhabiting grass stalks. Howard '95, p. 10
Hym. Grass joint worm, Isosoma californicum How.

Tripsacum dactyloides (gama or sesame grass)

Larvae between leaf blades. Felt '10a, p. 10
Itonid. Lasioptera tripsaci Felt

Sorghum saccharatum (Sorghum)

Reared from seeds. Dean '10, p. 39
Itonid. Sorghum midge, Contarinia sorghicola Coq.

Sorghum halpense (Johnson grass)

Reared from seeds. Dean '10, p. 39

Itonid. Sorghum midge, Contarinia sorghicola Coq.

? *Digitaria sanguinalis* (crab grass)

Reduced, swollen head, presumably resembling that of Asteromyia agrostis, on Muhlenbergia. Coq. '98, p. 71

Dipt. False spike grass fly, Chlorops graminea Coq.

Panicum (panic grass)

Ovipositing in stem. Felt '08e, p. 326

Itonid. Lasioptera panici Felt

Fig. 18. Black-sheath midge, Lasioptera inustorum Felt. Portion of stem showing blackened sheath. (Original)

Fig. 19. Siteroptes carnea Bks. Aborted plant of Aristida purpurea. (Original)

Fig. 20. Asteromyia agrostis O. S. Deformed head of Muhlenbergia. (Author's illustration)

Panicum virgatum

Blackened leaf sheath infested by orange-colored larvae, length of discolored area 3 cm. Fig. 18. Felt '16f, p. 182

Itonid. Black-sheath midge, Lasioptera inustorum Felt

Echinochloa crusgalli

Occurring in fibrous, somewhat decayed stems of the crown or in the lower portions of uninjured stems. Felt '16f, p. 181

Itonid. Grass crown midge, Lasioptera echinochloa Felt

Setaria glauca (bristly fox-tail grass)

Reared from seeds. Dean '10, p. 39

Itonid. Sorghum midge, Contarinia sorghicola Coq

Aristida (triple-awned grass)

Fasciated, reduced leaves, fruit aborted (Bethel in litt.) Banks, '05, p. 140. Fig. 19.
Acarid. Siteroptes carnea Bks.

Muhlenbergia

Fusiform stem enlargement. Fig. 20. Marten '93, p. 155
Itonid. Asteromyia agrostis O. S.

Fusiform stem enlargement, apparently an aborted Asteromyia agrostis gall.
Dipt. Chlorops ingrata Will.

Orange-colored larvae at the base of the leaf sheath and associated with localized, dead areas. Felt '18a, p. 129
Itonid. Lasioptera colorati Felt a2716

Fig. 21. False spike midge, Asteromyia ? agrostis. Deformed head of Distichlis. (Original)

Fig. 22. Sedge Psyllid, Livia maculipennis Fitch. Injured head. (Original)

Reared from deformed stems. Howard '95, p. 20
Hym. Joint-worm, Isosomorpha muhlenbergiae How.

Phleum pratensis (timothy)

Boring stems. Web. & Reeves '10
Hym. Western grass stem sawfly, Cephus occidentalis Ril. & Marl.

Injuring stem at base of leaf sheath
Itonid. Cecidomyia sp.

Alopecurus (fox-tail grass)

Reared from seeds. Felt '07e, p. 303
Itonid. Grass seed midge, Itonida setariae Felt

Sporobolus (drop-seed, rush grass)

Deformed heads, Banks, '05, p. 140
Acarid. Siteroptes carnea Banks

Agrostis (bent grass)

Elliptical stem swellings, length 7 to 10 mm, diameter 2 to 3 mm. Howard '95, p. 12
Hym. Grass joint-worm, Isosoma agrostidis How.

Ovipositing on A. alba. Felt '15e, p. 135
Itonid. Dasyneura graminis Felt

Avena (oat)

Reared from cage with aphid-infested seedlings, probably zoophagous. Felt '08e, p. 398
Itonid. Coquillettomyia texana Felt

Reared from cage sown with oats, probably from decaying vegetable matter. Felt '13m, p. 175
Itonid. Prionellus monilis Felt

Reared from oats, possibly fungivorous. Felt '11k, p. 550
Itonid. Mycodiplosis spinosa Felt

Danthonia (wild oat grass)

Probably a stem gall. Felt '09e, p. 287
Itonid. Oat grass midge, Lasioptera danthoniae Felt

Tridens (tall red top)

Reared from stems. Howard '95, p. 21
Hym. Red top borer, Eurytomocharis triodiae How.

Reared from seeds. Dean '10, p. 39
Itonid. Sorghum midge, Contarinia sorghicola Coq.

Eragrostis

Reared from apparently normal or small, swollen stems. Howard '95, p. 21
Hym. Red top borer, Eurytomocharis eragrostidis How.

Probably a stem gall, on E. minor. Felt '11k, p. 483
Itonid. Neolasioptera agrostis Felt

Distichlis (spike grass)

Fusiform stem enlargement produced by a massing of the apical or subapical growth (unpublished note). Fig. 21.
Itonid. False spike midge, ? Asteromyia agrostis O. S.

Aborted, club-shaped shoots with rudimentary lateral leaves, length 3 to 4 cm, diameter 3 to 4 mm, on D. spicata Banks, '05, p. 40
Acarid. Siteroptes carnea Bks., a2896

Ovate, bract-covered gall, length 18 mm, diameter 8 mm. Mall. '18, p. 386
Dipt. False spike grass fly, Anthracophaga distichliae Mall.

Poa pratensis (Kentucky blue grass)

Reared from an almost pure blue grass turf (Aldrich in litt.) Felt '15i, p. 149
Itonid. Colpodia sanguinia Felt
Gall unrecognized. Felt '08e, p. 416
Itonid. Colpodia pratensis Felt
Probably inhabiting stems. Howard '95, p. 13
Hym. Grass joint-worm, Isosoma captivum How.
Howard '95, p. 15
Hym. Grass joint-worm, Isosoma maculatum How.

Bromus (brome grass)

Reared from grass stems. Howard '95, p. 11
Hym. Grass joint-worm, Isosoma bromi How.
Reared from grass stems, B. ciliatus. Howard '95, p. 16
Hym. Grass joint-worm, Isosoma bromicola How.
Boring stems. Webs. & Reeves '10
Hym. Western grass-stem sawfly, Cephus occidentalis Ril. & Marl.

Agropyron (couch or quitch grass)

Under leaf sheath. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say
Boring stems. Webs. & Reeves '10
Hym. Western grass-stem sawfly Cephus occidentalis Ril. & Marl.

Boring grass stems. Howard '95, p. 12
Hym. Grass joint-worm, Isosoma hageni How.
Fusiform swellings, length 4 cm, diameter 4 mm, composed of reduced leaves and with a central gallery containing a yellowish white larva.
Hym. Grass joint-worm, ? Isosoma sp. a2746

Hordeum (barley)

Under leaf sheaths. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say
Reared from stems. Howard '95, p. 18
Hym. Barley joint-worm, Isosoma hordei Harr.

Secale (rye)

Reared presumably from stems. Howard '95, p. 19
Hym. Rye joint-worm, Isosoma secale Fitch
Howard '95, p. 20
Hym. Grass joint-worm, Isosoma fitchii How.

Elymus (wild rye)

Under leaf sheath. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say
Probably from stem gall. Felt '15e, p. 90
Itonid. Rhabdophaga elymi Felt

Boring stems. Webs. & Reeves '10
Hym. Western grass-stem sawfly, Cephus occidentalis Ril. & Marl.

Probably inhabiting stems. Howard '95, p. 14
Hym. Rye joint-worm, Isosoma elymi French

Reared from grass stems. Howard '95, p. 16
Hym. Wheat joint-worm, Isosoma tritici Fitch

Cyperaceae (sedges

Cyperus (sedge)

Rather cylindrical, bud or shoot galls occurring at the very base of the plant, length 4 to 5 mm. Felt '16f, p. 176
Itonid. Sedge bud gall, Hormomyia caudata[1] Felt

Dulichium

Reared from fruit. Felt '12f, p. 241
Itonid. Sedge fruit midge, Thecodiplosis dulichii Felt
Lestodiplosis sp.

Scirpus (bulrush or club rush)

Gall undescribed.
Itonid. Cecidomyia sp.

Juncaceae (rushes)

Deformed fruit
Itonid. Rush fruit midge, Cecidomyia sp.

Juncus (rush)

Infertile, deformed inflorescence, the floral organs being produced as a moderately dense cluster of slender, linear bracts having a length of 3 to 4 cm. Fig. 22. Patch '16, p. 21
Hemip. Sedge Psyllid, Livia maculipennis Fitch

Liliaceae (lily family)

Oakesia

Yellowish blister gall.
Itonid. Cecidomyia sp.

Yucca

Reared from pods. Felt '15e, p. 140
Itonid. Yucca pod midge, Dasyneura yuccae Felt

Reared from stem, probably predaceous. Felt '08e, p. 408
Itonid. Lestodiplosis yuccae Felt

Smilacina (false Solomon's seal)

Deformed berries. Felt '16d, p. 131
Itonid. Asphondylia smilacinae Felt

Root gall. Bishop '11, p. 346
Itonid. Dasyneura smilacinae Bish.

[1] It is probable that a number of Hormomyias produce bud or shoot galls on various sedges.

Maianthemum

Leaf blister gall, brown, diameter 6 mm.

Itonid. Cecidomyia sp.

Fusiform, monothalamous root gall, length 7 mm, diameter 1.5 mm. Fig. 23. Felt '15h, p. 405

Itonid. Dasyneura torontoensis Felt

Polygonatum (Solomon's seal)

Leaf blister gall, diameter 4 mm. Itonid. Cecidomyia sp.

Smilax (green brier)

Reared from oval blisterlike leaf spots. Pl. 7, fig. 7. Felt '08e, p. 334

Itonid. Smilax blister, Camptoneuromyia rubifolia Felt

Leaf blister gall, diameter 4 mm, S. herbacea

Itonid. Cecidomyia sp.

Fig. 23. Dasyneura torontoensis Felt. (Original)

Fig. 24. Cecidomyia sp. Stem gall, a1436. (Original)

Fig. 25. Orchid Isosoma, Isosoma orchidearum Westw. Infested pseudobulbs. (After Forbes)

Young leaves rolled longitudinally. Felt '15e, p. 147

Itonid. Smilax leaf midge, Dasyneura smilacifolia Felt

Irregularly rounded, abrupt, polythalamous, green stem swellings, diameter 16 mm. Fig. 145, 6. Beutm. '09, p. 143

Cynipid. Smilax stem gall, Diastrophus smilacis Ashm.

Dioscoreaceae (yam)

Dioscorea

Irregular, warty stem gall. Fig. 24. Itonid. Cecidomyia sp.

Iridaceae (Iris family)

Iris (fleur-de-lis)

Oval, green leaf gall, length 12 to 18 mm, diameter 12 mm. Pl. 4, fig. 2. Claus. '18, p. 9

Dipt. Iris leaf gall, Agromyza laterella Zett.

Orchidaceae

Cattleya

Irregular root galls. Felt '15i, p. 89

Itonid. Orchid root gall, Parallelodiplosis cattleyae Moll.

Subspherical or subconical pseudobulbs. Fig. 25. Felt '15i, p. 89

Hym. Orchid Isosoma, Isosoma orchideum Westw.

Salicaceae (willows and poplars)

Salix (willow)

Key to willow galls

Fruit galls, p. 29
Bud galls, p. 29
Rosette galls, p. 30
Leaf galls, p. 32
Leaf rolls or folds, p. 32
Capsule or pocket galls, p. 32
Turgid leaf galls, p. 33
Twig galls, p. 34

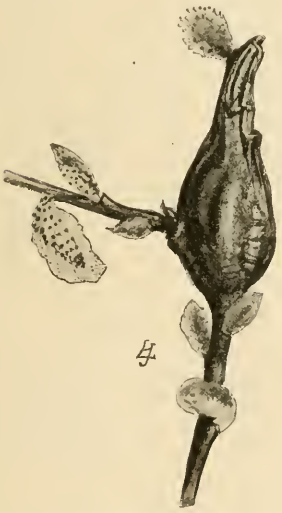

Fig. 26. Beaked willow gall, Phytophaga rigidae O. S. Typical gall. (Author's illustration)

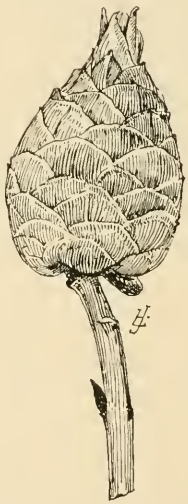

Fig. 27. Pine cone gall, Rhabdophaga strobiloides Walsh. Typical gall. (Author's illustration)

Fruit galls

Enlarged seeds, reddish brown

Itonid. Cecidomyia sp.

Bud galls

Apical willow buds blasted. Pl. 12, fig. 3

Itonid. Cecidomyia p.

Apical, fusiform, beaked gall, length 2 cm. Fig. 26, pl. 11, fig. 5. Felt '06a, p. 112

Itonid. Beaked willow gall, Phytophaga rigidae O. S.

Reared from similar gall. Felt '15e, p. 88

Itonid. Rhabdophaga sodalitatis Felt

Reared from apparently normal bud. Felt '15e, p. 97

Itonid. Rhabdophaga latebrosa Felt

Small, conic, apical bud gall. Felt '15e, p. 177

Itonid. Dasyneura gemmae Felt

Fusiform apical bud gall, length 1 cm, diameter 7 mm

Itonid. ? Rhabdophaga sp., a1828

Small bud gall. Felt '15e, p. 100

Itonid. Rhabdophaga gemmae Felt

Ovate, terminal bud gall, diameter 1 cm. Walsh '64, p. 583

Itonid. Rhabdophaga gnaphalioides Walsh

Fig. 28. Phytophaga walshii Felt. Typical cluster of galls. (Original)

Fig. 29. Clustered willow gall, Rhabdophaga racemi Felt. Typical form. (Original)

Fig. 30. Clustered willow gall, Rhabdophaga racemi Felt. Provisionally referred to this species. (Original)

Small bud gall. Felt '15e, p. 164

Itonid. Dasyneura californica Felt

Deformed leaf and twig, usually clustered near the apex, whitish green, turning black by winter, on S. fragilis. Chad. '08, p. 145

Acarid. Eriophyes sp.

A mass of small, filamentous structures on leaf or stem, sometimes on distorted buds, on S. nigra. Walsh '66, p. 227

Acarid. Eriophyes aenigma Walsh

Rosette galls

Pine conelike gall, length 2 to 2.5 cm. Fig. 27. Felt '15e, p. 112

Itonid. Pine cone gall, Rhabdophaga strobiloides Walsh

Reared from above gall, ? inquiline. Walsh '64, p. 629
Itonid. Dasyneura annulipes Walsh
Reared from above gall, ? inquiline. Walsh '64, p. 628
Itonid. Dasyneura atricornis Walsh
Reared from above gall, ? inquiline. Walsh '64, p. 626
Itonid. Cecidomyia atrocularis Walsh
Reared from above gall, ? inquiline. Felt '15e, p. 179
Itonid. Dasyneura albovittata Walsh
Reared from above gall, predaceous. Walsh '64, p. 631
Itonid. Lestodiplosis decemmaculata Walsh
Spongy or clustered, rosette gall. Fig. 28. Felt '08e, p. 371
Itonid. Phytophaga walshii Felt
Large, close, pine, conelike gall resembling a slender R. strobiloides gall. Felt '15e, p. 90
Itonid. Rhabdophaga persimilis Felt

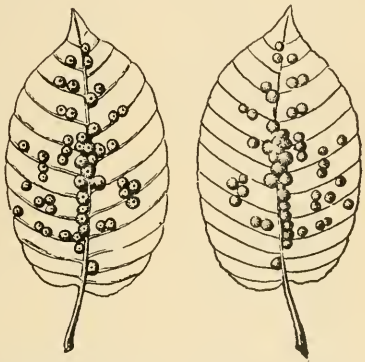

Fig. 31. Willow blister gall, Oligotrophus salicifolius Felt, showing upper and lower surface of leaf. (Original)

Large, open, rosette gall, diameter 1 to 2 cm. Pl. 11, fig. 7. Felt '15e, p. 113
Itonid. Willow-cabbage gall, Rhabdophaga brassicoides Walsh
Reared from above gall, ? inquiline. Walsh '64, p. 630
Itonid. Lestodiplosis septemmaculata Walsh
Reared from above gall, ? inquiline. Ckll. '90, p. 280
Itonid. Rhopalomyia frater Ckll.
Reared from above gall, ? inquiline. Walsh '64, p. 623
Itonid. Dasyneura orbitalis Walsh
Large, loose, rosette gall, length 1 to 2 cm. Felt '15e, p. 111
Itonid. Rhabdophaga rhodoides Walsh
Oval, small, rosette gall, resembling a small R. brassicoides gall. Felt '15e, p. 103
Itonid. Small willow-cabbage gall, Rhabdophaga normaniana Felt

Small, clustered, rosette gall, length 2 cm. Fig. 29, 30. Felt '15e, p. 94
Itonid. Clustered willow gall, Rhabdophaga racemi Felt

Leaf galls

Leaf rolls or folds

Fusiform pod or curled leaves, length 10 mm. Pl. 10, fig. 2. Felt '15e, p. 169
Itonid. Willow-pod midge, Dasyneura salicifolia Felt

Closely rolled, terminal leaves. Felt '15e, p. 93
Itonid. Rhabdophaga plicata Felt

One or two narrow, longitudinal, yellowish green or brown upward folds opening below, on S. longifolia. Chad. '08, p. 145
Acarid. Eriophyes salicicola Garm.

Small thickenings or inrollings of the leaf margin, green, scattered or coalescent, on S. alba. Chad. '06, p. 144
Acarid. Eriophyes sp.

Irregular, more or less crenulate midrib fold, length 7 mm. Utah
Acarid. Eriophyes sp. a2759

Capsule or pocket galls

Very small, crimson red, pocket galls or semicapsules, on S. amygdaloides. Chad. '08, p. 144
Acarid. Eriophyes sp.

Fig. 32. Willow pea gall, Pontania pisum Walsh. (Original)

Fig. 33. Willow apple gall, Pontania pomum Walsh, side view. (Original)

Small, irregular, serrate, roughened, pocket galls or semicapsules, green or red, usually on upper surface, on S. alba, balsamifera, discolor and rostrata. Pl. 16, fig. 8. Chad. '08, p. 144
Acarid. Eriophyes sp.

Purple or pale green capsule gall on both surfaces of the leaf, on S. cordata. Chad. '08, p. 145
Acarid. Eriophyes sp.

Irregularly hemispherical, greenish yellow, pocket gall on either surface, on S. nigra. Chad. '08, p. 146
Acarid. Eriophyes semen Walsh

Small and very crowded, pocket galls on leaves of S. nigra. Chad. '08, p. 146
Acarid. Eriophyes sp.

Small, irregular, spherical galls on upper surface of leaves. Chad. '08, p. 146
Acarid. Eriophyes sp.

Filamentous structures on leaf. Walsh '66, p. 227

Acarid. Eriophyes aenigma Walsh

Turgid leaf galls

Smooth, flattish, fleshy, sessile, yellowish green, on both surfaces of the leaf, length 6 to 12 mm, on S. humilis. Pl. 3, fig. 8. Walsh '66, p. 257

Hym. Pontania desmodioides Walsh

Yellowish, red-spotted, flattened gall, diameter 2 to 3 mm. Fig. 31. Felt '10d, p. 354

Itonid. Willow blister gall, Oligotrophus salicifolius Felt

Fig. 34. Rhabdophaga caulicola Felt. Infested stems, two sectioned. (Original)

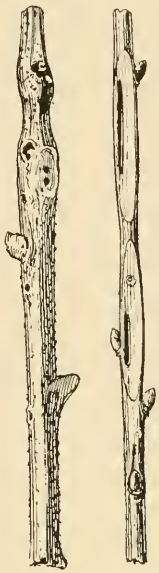

Fig. 35. Sackenomyia packardi Felt. Infested twig and another in section showing characteristic galleries. (Original)

Fig. 36 Sackenomyia porterae Ckll. Infested twig. (Original)

Subconical, truncate, greenish yellow, lipped gall, diameter 2 mm. Pl. 10, fig. 6. Walsh '64, p. 606

Itonid. Willow lipped gall, Hormomyia verruca Walsh

Apparently reared from the same gall. Felt '07a, p. 108

Itonid. Clinorhyncha filicis Felt

Conical, monothalamous, petiole gall, length 6 to 9 mm, diameter 3 to 4 mm. Rohw. '15, p. 213

Hym. Euura cosensii Rohw.

Ovate, fleshy, reddish, willow leaf galls in parallel rows on either side of the midrib, brownish red, beneath white, tinged with purple, length 7 to 10 mm, on S. fragilis. Felt '06b, p. 638

Hym. Pontania hyalina Nort.

Subspherical, pealike, hollow, pale yellowish green gall on under side of leaf, usually on a side vein, diameter 5 to 7 mm. Fig. 32, pl. 3, fig. 9. Felt '06b, p. 637

Hym. Willow pea gall, Pontania pisum Walsh

Rounded or ovate, fleshy, yellowish green, usually rosy-cheeked gall, projecting slightly on the upper surface, diameter 12 mm. Fig. 33. Felt '06b, p. 636

Hym. Willow apple gall, Pontania pomum Walsh

Fig. 37. Rhabdophaga podagrae Felt. Swollen twig. (Author's illustration)

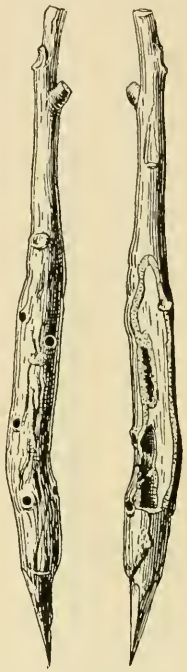

Fig. 38. Rhabdophaga cornuta Walsh. Swollen twig and one in section showing galleries. ×(Original)

Very similar gall, prominent on both surfaces of the leaf, on S. petiolaris. Cosens, '17, p. 18

Hym. Pontania petiolaris Rohw.

Fusiform, mid vein swelling, length 3 mm, diameter .75 mm. Cosens in litt.

Hym. ? Euura sp.

Twig galls

Reared from twigs, gall unrecognized. Felt '07e, p. 297

Itonid. Asphondylia salictaria Felt

Larvae in subcortical cells; no swelling. Felt '15e, p. 168

Itonid. Dasyneura corticis Felt

Reared from apparently unmodified branches and limbs of Salix fendleriana. Felt '16f, p. 191

Itonid. Phytophaga timberlakei Felt

Slender twigs slightly enlarged. Felt '08e, p. 370

Itonid. Phytophaga americana Felt

Slender twigs slightly enlarged. Fig. 34. Felt '08e, p. 370

Itonid. Phytophaga caulicola Felt

Slender twigs slightly enlarged. Felt '15e, p. 103

Itonid. Rhabdophaga caulicola Felt

Slender twigs slightly enlarged. Fig. 35. Felt '09e, p. 290

Itonid. Sackenomyia packardi Felt

Slender twigs slightly enlarged. Fig. 36. Ckll. '04, p. 155

Itonid. Sackenomyia porterae Ckll.

Twigs probably hardly enlarged. Felt '08e, p. 371

Itonid. Phytophaga perocculta Ckll.

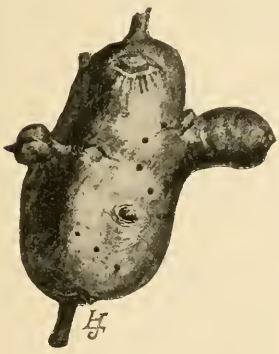

Fig. 39. Willow potato gall, Rhabdophaga batatus Walsh. Typical enlargement. (Author's illustration)

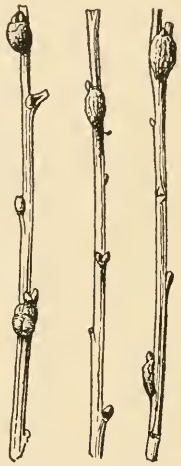

Fig. 40. Scarred willow gall, Phytophaga tumidosae Felt. (Original)

Inconspicuous, knot or twig enlargement. Felt '08e, p. 358

Itonid. Phytophaga latipennis Felt

Twig uniformly enlarged, gall 5 to 7 cm long. Fig. 37. Felt '15e, p. 109

Itonid. Rhabdophaga podagrae Felt

Gall similar to above, cells in wood. Fig. 38. Felt '15e, p. 110

Itonid. Rhabdophaga cornuta Walsh

Gradual enlargement of the twig, usually extending partly around it and several near each other, polythalamous, length 1 to 3 cm. Rohw. '09, p. 15

Hym. Euura nodus Walsh

Gradual twig enlargement, length 30 mm, diameter 7 to 10 mm, on S. luteosericea. Rohw. '09, p. 16

Hym. Euura macgillivrayi Rohw.

Twigs enlargement, abrupt basally, resembles that of E. macgillivrayi Rohw. '09, p. 24.

Hym. Euura propinquus Rohw.

A mass of filamentous structures on the stem. Walsh '66, p. 227

Acarid. Eriophyes aenigma Walsh

Apical, fusiform, beaked gall, length 2 cm. Fig. 26, pl. 11, fig. 5. Felt '06a, p. 122

Itonid. Beaked willow gall, Phytophaga rigidae O. S.

Reared from similar gall. Felt '15e, p. 88

Itonid. Rhabdophaga sodalitatis Felt

Twigs irregularly enlarged, galls 1 to 3 cm long. Pl. 12, fig. 2. Felt '15e, p. 96

Itonid. Rhabdophaga salicis Schr.

Twig irregularly enlarged, gall 1 to 3 cm long, the stems between the buds dwarfed, giving a " wheat ear " appearance. Pl. 12, fig. 4. Felt '15e, p. 88

Itonid. Wheat ear gall, Rhabdophaga triticoides Walsh

Fig. 41. Cecidomyia sp., two types of subglobular galls on poplar leaves, the true producers unknown. (Original)

Irregular, ovoid or subglobular galls, diameter 1 to 2 cm. Fig. 39. Felt '15e, p. 105

Itonid. Willow potato gall, Rhabdophaga batatus Walsh

Reared from same gall. Felt '15e, p. 92

Itonid. Rhabdophaga ramuscula Felt

Reared from same gall, dried. Felt '08e, p. 421

Itonid. Asynapta saliciperda Felt

Nodular gall at base of twigs, length 8 mm. Pl. 11, fig. 9. Felt '15e, p. 91

Itonid. Nodule willow gall, Rhabdophaga nodula Walsh

Irregularly elongated, ovate, reddish brown, spongy twig gall, 10 to 20 mm long. Pl. 3, fig. 7. Rohw. '09, p. 12

Hym. Willow egg gall, Euura ovum Walsh

Subglobose galls, the surface scarred, diameter 4 mm. Fig. 40. Felt '08e, p. 370

Itonid. Scarred willow gall, Phytophaga tumidosae Felt

Subglobular lateral gall with dead area on one side, diameter 9 mm. Pl. 11, fig. 8. Felt '15e, p. 100

Itonid. Rhabdophaga globosa Felt

Abrupt, elongate twig swelling, length 10 to 35 mm, height 8 to 11 mm, width 7 to 12 mm, on S. rostrata. Rohw. '09, p. 18

Hym. Euura bebbianae Rohw.

Lateral, monothalamous twig enlargements 4 to 9 mm long, 3 to 4 mm wide. Rohw. '09, p. 10

Hym. Euura orbitalis Nort.

Aborted, lateral, pale, roughened twig swellings, length 10 mm, width 7 mm. Rohw. '09, p. 11

Hym. Euura cooperae Ckll.

Globose, constricted twig swellings, diameter 1.5 cm. Chitt. '00, p. 68

Coleop. Agrilus politus Say

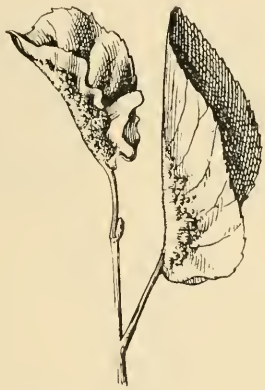

Fig. 42. Cecidomyia sp., the larvae producing a midvein fold. (Original)

Irregularly ovate twig swelling, length 4 cm, diameter 3 cm. Felt & Joutel '04, p. 73

Coleop. Saperda concolor Lec.

Irregular, branch and trunk swellings, mostly on branches or smaller stem s produced by transverse galleries just under the bark. Felt '06b, p. 103

Coleop. Mottled willow borer, Cryptorhynchus lapathi Linn.

Populus (poplar)

Irregular, greenish, subtriangular, monothalamous petiole or twig galls, length 1 cm, diameter .7 cm, on cottonwood

Itonid. Cecidomyia sp. a1513

Globose, purplish, sometimes adherent masses of deformed flowers, diamete 1.5 cm, from Mojave desert

Acarid. Eriophyes sp. a2761

Irregular, monothalamous blister leaf gall. Stebb. '10, p. 9

Itonid. Cecidomyia sp. (irregularis Stebb.)

Subglobular leaf gall. Felt '15e, p. 206

Itonid. Rhizomyia absobrina Felt

Variable, subglobular leaf gall.[1] Fig. 41. Felt '08e, p. 394

Itonid. Dicrodiplosis populi Felt

Apparently from the same gall, probably predaceous. Felt '08e, p. 409

Itonid. Lestodiplosis globosa Felt

Subglobular leaf gall, diameter 3 to 4 mm. Felt '08e, p. 400

Itonid. Mycodiplosis populifolia Felt

Roundly conical leaf gall, diameter 3 mm, on P. candicans, balm-of-Gilead. Pl. 7, fig. 2.

Itonid. Cecidomyia sp.

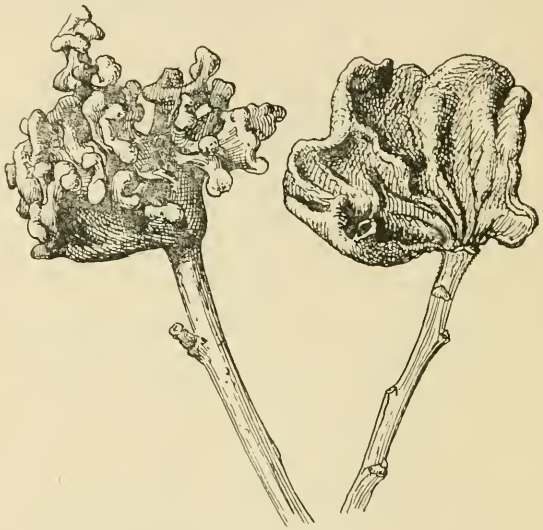

Fig. 43. Vagabond poplar gall, Pemphigus vagabundus Walsh. (Original)

Irregular, tumid gall at base of leaf, similar to that of Lasioptera vitis

Itonid. Cecidomyia sp.

Subglobular galls, diameter 6 to 12 mm, occur in June at the base of cottonwood leaves. Felt '06b, p. 636

Aphid. Pemphigus populicaulis Fitch

Marginal leaf roll, length 1 cm, predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis populifolia Felt

Brown, marginal leaf roll, length 2.5 cm, several larvae in each

Itonid. Cecidomyia sp.

Both edges of the leaf inrolled toward each other, on the upper surface. Chad. '08, p. 138

Acarid. Eriophyes sp.

[1] There are a series of these globose or conical galls on poplar leaves which are apparently produced by several species of gall midges.

Longitudinal fold galls dwarfing the leaf. Fig. 42.

Itonid. Cecidomyia sp.

Light red, cockscomb-like gall developing on the upper surface from the mid-vein. Pack. '90, p. 472

Aphid. Pemphigus populi-venae Fitch

A rib gall on the main vein, on P. heterophylla. Chad. '08, p. 137

Acarid. ? Eriophyes sp.

Irregularly folded, convolute mass of foliage some 2 inches in diameter, frequently apical. Fig. 43. Felt '06b, p. 635

Aphid. Vagabond gall, Pemphigus vagabundus Walsh

Irregular, pinkish and light green, pod-shaped shelters formed by apposed leaf edges and containing numerous white plant lice, length 2.5 to 3 cm, diameter 1 cm, on Lombardy poplar.

Aphid. Purse leaf gall, Pemphigus affinis Kalt.

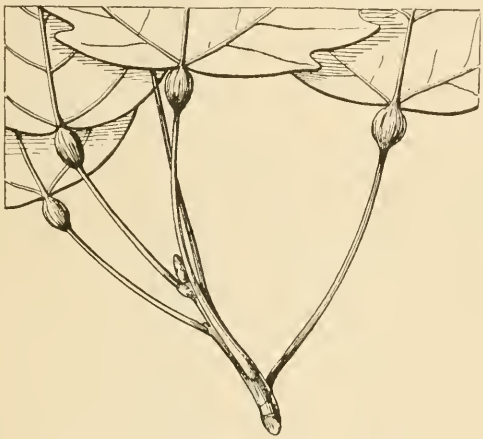

Fig. 44. Ribbed petiole gall, Ectoedemia populella Busck. (Original)

An olive buff to olive brown erineum or dimple, slightly indented on the under side of the leaf, diameter 6.5 mm or less, one to eight on a leaf. Chad. '08, p. 137

Acarid. Eriophyes sp.

Dimples "on the leaves on the upper side, lined with spherical granules, reddish or greenish in color." The galls are green, 3 or 4 on a leaf, diameter 2 to 3 mm, possibly identical with the preceding. Chad. '08, p. 137

Acarid. Eriophyes sp.

White to dark brown erineum or dimple gall on the under side of the leaf of P. grandidentata. Chad. '08, p. 136

Acarid. Eriophyes sp.

A small, green or red, pocket gall on the upper side of the leaf of P. grandidentata. Chad. '08, p. 136

Acarid. Eriophyes sp.

A large, deep, sharply defined dimple, green, orange yellow within, diameter 4 to 12 mm, convex toward the upper surface of the leaf, on P. nigra var. italica. Chad. '08, p. 137

Acarid. Eriophyes sp.

Oval, somewhat elongate galls with transverse openings occur near the middle of the leaf petioles of cottonwood, the latter part of the summer. Felt '06b, p. 635

Aphid. Poplar leaf stem gall, Pemphigus populitransversus Ril.

Globose petiole gall at the base of the leaf and with a transverse mouth. Pack. '90, p. 470

Aphid. Basal leaf gall, Pemphigus populicaulis Fitch

Subglobular, distinctly ridged, monothalamous, petiole gall at the base of the leaf, diameter 5 to 7 mm. Fig. 44. Busck '07, p. 98

Lepid. Ribbed petiole gall, Ectoedemia populella Busck

An irregular, large stem and petiole deformation. Pl. 16, fig. 3. Chad. '08, p. 138

Acarid. Eriophyes populi Nal.

Oval twig gall, length 3 to 4 cm, diameter 3 cm. Felt and Joutel, '04, p. 368

Coleop. Saperda populnea Linn.[1]

Irregular, branch and trunk swellings, mostly on branches or smaller stems, produced by transverse galleries just under the bark. Felt '06b, p. 103

Coleop. Mottled willow borer, Cryptorhynchus lapathi Linn.

Irregularly oval swellings on the smaller twigs, length 3 mm. Pl. 4, fig. 3. Felt '06b, p. 634

Dipt. Poplar twig gall fly, Agromyza schineri Giraud

Irregular, subconical twig or petiole gall, length 1 cm

Itonid. Cecidomyia sp.

Oval, white cocoons on twigs. Felt '15e, p. 102

Itonid. Rhabdophaga populi Felt

In decaying wood. Felt '11k, p. 476

Itonid. Kronomyia populi Felt

Myricaceae (sweet gale family)

Myrica cerifer (wax myrtle)

Bud galls. Beutm. '07d, p. 306

Itonid. Itonida myricae Beutm.

Myrica asplenifolia (sweet fern)

Fleshy vein folds, length 2 to 4 mm. Fig. 45. Felt '07a, p. 159

Itonid. Sweet fern midge, Janetiella asplenifolia Felt

[1] Prof. T. D. A. Cockerell has described the gall of S. lesquereuxi on Populus lesquereuxi from the miocene shales of Florissant, *see* Proc. U. S. Nat. Mus., no. 2146, p. 105, 1916.

Myrica carolinensis (bayberry)

Bayberry leaves badly dwarfed and deformed. Pl. 15, fig. 6. Thompson '16, p. 80

Acarid. Eriophyes sp.

Juglandaceae (walnut family)

Juglans cinerea (butternut)

Folded, appressed, crinkled leaves

Itonid. Cecidomyia sp.

Fig. 45. Sweet fern midge, Janetiella asplenifolia Felt. Deformed leaves. (Author's illustration)

A brown, velvety erineum surrounding the leaf stalks or on the main veins, causing a swelling and bending of the stalk or vein; also on black walnut. Chad. '08, p. 135

Acarid. Eriophyes sp.

A button-shaped, pocket gall usually on the upper side of the leaf, green or lighter colored, beneath widely opened and lined with whitish or brownish hairs. Chad. '08, p. 135

Acarid. Eriophyes sp.

Juglans nigra (black walnut)

An erineum and blister on the leaf. Chad. '08, p. 135

Acarid. Eriophyes tristriatus Nal.

A green warty, pocket gall on either surface, chiefly the upper, diameter 2 to 5 mm. Chad. '08, p. 136

Acarid. Eriophyes sp.

Carya (hickory)

Key to hickory galls

Occurring under the bark, p. 42
Leaves rolled or folded, p. 42
Axillary vein galls, p. 42
Leaf blisters, p. 42
Cylindric leaf galls, p. 42
Conical leaf galls, without a distinct orifice, p. 43
Conical or globose leaf galls with distinct orifice and containing aphids, p. 43
Globose leaf galls (other than those described above), smooth, or nearly so, p. 46
Globose leaf galls — hairy, p. 46
Midrib or vein gall, p. 47
Leaf folds and ridges, p. 47
Petiole or twig galls, p. 47
Occurring on leaf, producing no gall, p. 47
Swellings in husks, p. 49

Occurring under bark

Under dying, sappy bark.

Itonid. Cecidomyia sp.

Under decaying bark. Felt '13m, p. 205

Itonid. Miastor americana Felt

Leaves rolled or folded

Leaf edges narrowly inrolled, especially toward the base, on C. pecan (possibly the same species has been recorded by Thompson from Massachusetts). Pl. 15, fig. 4. Chad. '08, p. 152

Acarid. Eriophyes sp.

" Deformation and folds on the leaf," on C. alba. Chad. '08, p. 135

Acarid. Eriophyes sp.

Axillary vein galls

Small, axillary galls in the angles of the lateral veins. Wells '15, p. 43

Acarid. Eriophyes sp.

Leaf blisters

Irregular, dull greenish or black-margined, slightly nippled, diameter 3 mm. Pl. 5, fig. 8.

Itonid. Cecidomyia sp.

Cylindric leaf galls

Greenish or black, cylindric, length 4 to 5 mm, diameter 1 mm. Fig. 46. Felt '09e, p. 293

Itonid. Hickory tube gall, Caryomyia tubicola O. S.

Similar to preceding but longer, curved and tapering, length 5 to 7 mm, diameter 1.4 mm, light green basally, dark brown or black apically. Wells '15, p. 53

Itonid. Cecidomyia sp.

Slender, tapering, suberect, light greenish with flaring, dentate base, length 5 to 8 mm, basal diameter 2.5 to 3.5 mm. Wells '15, p. 47

Itonid. Cecidomyia sp.

Greenish, hairy, length 5 mm, beaked, on C. alba

Caryomyia sp., a2526

Conical leaf galls, without a distinct orifice

Base subglobular, a long, slender apical process, greenish to reddish brown, length 3 to 4 mm, occurs in groups on midrib of bitternut hickory. Pl. 6, fig. 2, 3. Osten Sacken '62, p. 192

Itonid. Hickory seed gall, Caryomyia caryaecola O. S.[1]

Conical, nearly symmetrical, thin-walled, small, green or red tinted, length 2 mm. Felt '09e, p. 293

Itonid. Conical hickory gall, Caryomyia sanguinolenta O. S.

Narrowly conical, light green midrib or vein gall, length 5 mm, diameter 1 mm.

Itonid. Caryomyia sp.

Conical or globose leaf galls with distinct orifice and containing aphids

Galls more or less conical above and beneath, opening on the upper surface, both nipples surrounded at the apex by a fringe of long filaments, walls thin,

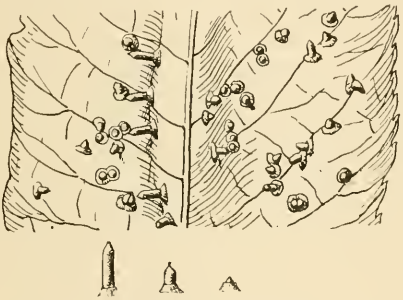

Fig. 46. Hickory tube gall, Caryomyia tubicola O. S. Group of galls on under side of leaf and several stages shown below in profile. (Original)

more or less transparent, diameter 5 to 12 mm, height 4 to 6 mm. Perg. '04, p. 190

Aphid. Phylloxera caryaeseptem Shim.

Similar to the preceding, with both cones very much elongated, slender and toothlike, length of cones 3 to 8 mm, diameter 2 to 4 mm. Perg. '04, p. 190

Aphid. Phylloxera caryaeseptem Shim. var. perforans Perg.

Galls conical above, opening on the upper surface, flat beneath, splitting into several bracts when mature, with slender filaments at the center beneath, walls papery, more or less transparent, diameter 5 mm. Perg. '04, p. 194

Aphid. Phylloxera caryaefoliae Fitch

Galls similar to P. caryaeseptem, opening on upper surface, smaller, more flattened but slightly convex above and beneath, opening round or oval, surrounded by short, recurved, pubescent bracts, a minute, closed nipple beneath, diameter 3 to 6 mm, height 2 to 3 mm. Perg. '04, p. 197

Aphid. Phylloxera picta Perg.

[1] Schizomyia caryaecola Felt was supposed to have been reared from this gall. The one or two specimens obtained were probably accidental.

Galls smaller though similar to P. picta, opening on upper surface, more convex and often with a slight depression above, no opening above before maturity, a minute, closed nipple beneath, diameter 3 to 6 mm, height 2 to 3 mm. Perg. '04, p. 189

Aphid. Phylloxera intermedia Perg.

Gall convex, opening on the under surface, the walls papery, more elevated above than beneath, with a reddish or crimson fovea or dimple above, varying in depth; the orifice beneath small and surrounded by a fringe of short, flaring bracts, diameter 3 to 5 mm, height 1 to 3 mm. Perg. '04, p. 200

Aphid. Hickory button gall, Phylloxera foveola Perg.

Gall concave above, with orifice on under surface, the walls papery, convex beneath, the nipple formed of rather long, slender filaments, the depression above as well as the surface beneath, including the filaments, with long, white hairs, diameter 3 to 6 mm, height 2 to 3 mm. Perg. '04, p. 203

Aphid. Phylloxera pilosula Perg.

Gall small, the walls papery, slightly convex above, more prominent beneath, usually with a small, shallow depression toward one side, above, nipple short, without bracts, the orifice beneath, more or less oval and fringed with short pubescence, diameter 1.5 mm. Perg. '04, p. 205

Aphid. Phylloxera deplanata Perg.

Gall medium, the walls papery, slightly convex above and beneath with a short nipple, having a rounded orifice surrounded by a burlike fringe of many filaments, diameter 3.8 to 6.2 mm, height 3 mm. Perg. '04, p. 208

Aphid. Phylloxera depressa Shim.

Gall medium, opening on the under surface, walls papery, quite flat, above, with a dimpled depression, the opening beneath round and with a downy orifice, diameter 1.5 mm, height 3 to 4 mm. Perg. '04, p. 209

Aphid. Phylloxera foveata Shim.

Gall medium, walls papery, convex and considerably elevated above and more prominent than beneath, rather hard, smooth and shining, the orifice beneath round and closed; resembles the gall of P. caryaesemen, diameter .6 to 2 mm. Perg. '04, p. 210

Aphid. Phylloxera minima Shim.

Gall minute, walls papery, red, more convex and more prominent above than beneath, with a dimpled depression, the nipple short and the orifice beneath surrounded by short, hairy bracts, diameter .3 to 2 mm, height .2 to 5 mm. Pl. 14, fig. 8. Perg. '04, p. 211

Aphid. Phylloxera caryaesemen Walsh

Gall medium, walls papery, conical above and much more prominent than the convex under surface, the nipple short with the oval orifice beneath, fringe with short hairs, diameter 1.5 mm. Pl. 14, fig. 5. Perg. '04, p. 214

Aphid. Phylloxera caryaefallax Ril.

Gall large, fleshy, convex on both surfaces, more prominent on the lower, the circumference above buttonlike, with a more or less sharply defined edge either above or sunken beneath the surface of the leaf, nipple short, surrounded by short bracts, the orifice beneath round, diameter 3 to 11 mm, height 1.6 to 3.4 mm. Pl. 14, fig. 7. Perg. '04, p. 217

Aphid. Phylloxera rimosalis Perg.

Gall subglobose, walls fleshy, about equally prominent above and beneath,

without a nipple, the orifice beneath a transverse slit, diameter 8 to 14 mm, height 2 to 4 mm. Perg. '04, p. 220

Aphid. Phylloxera caryaescissa Ril.

Gall subglobose, walls fleshy, somewhat more prominent above than beneath, without a nipple, the orifice beneath an elongate slit, size one-half to one-third the extreme diameter of P. caryaecaulis. Fig. 47, pl. 14, fig. 6. Perg. '04, p. 222

Aphid. Phylloxera caryaeglobuli Walsh

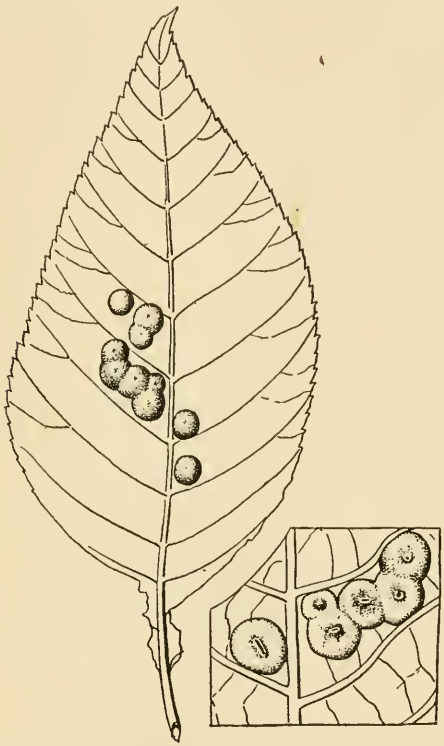

Fig. 47. Phylloxera caryaeglobuli Walsh. Group of galls with small group enlarged and showing orifice on under surface. (Original)

Gall subglobose, walls fleshy, about equally prominent on both leaf surfaces, conical beneath, ending in a short nipple and splitting into several stout bracts, diameter 3 to 7 mm, height 2 to 5 mm. Perg. '04, p. 225

Aphid. Phylloxera conica Shim.

Gall flat above, walls fleshy, either flush with or sunken below the leaf surface, globular or pyriform beneath and more or less constricted at the base, with or without a distinct nipple which, when present, splits into several bracts, diameter and height 5 to 10 mm. Pl. 14, fig. 4. Perg. '04, p. 228

Aphid. Phylloxera caryae-avellana Ril.

Gall medium, walls fleshy, quite flat above, usually with a more or less distinct median depression, prominent and conical beneath, not constricted at the base, the nipple distinct, surrounded by short bracts, diameter 2.5 mm, height 3 to 4 mm. Perg. '04, p. 232

Aphid. Phylloxera symmetrica Perg.

Gall large, walls fleshy, more or less irregular, convex above, more prominent and conical beneath, splitting at maturity into several very long bracts, diameter 5 to 10 mm, height 3 to 8 mm. Perg. '04, p. 235

Aphid. Phylloxera notabilis Perg.

Gall large, walls fleshy, globular, projecting about equally on both leaf surfaces, nipple short, with four to five short, stout pubescent bracts surrounding the orifice, curving outwards when old, size variable. Perg. '04, p. 236

Aphid. Phylloxera globosa Shim.

Gall large, walls fleshy, pedunculate and more or less elongated, suspended from the under surface by a slender petiole, quite sticky when fresh, splitting at the apex into several long filaments. Perg. '04, p. 238

Aphid. Phylloxera caryaegummosa Ril.

Globose leaf galls (other than those described above) smooth or nearly so

Nearly smooth, thin-walled, yellowish green or brown, sparsely haired, usually with a slight nipple, diameter 2 mm. Pl. 6, fig. 7. Felt '09e, p. 293

Itonid. Hickory leaf gall, Caryomyia caryae O. S.

Reared from the same gall, probably inquiline. Osten Sacken '62, p. 191

Itonid. Cecidomyia caryae O. S.

Thin-walled, depressed, yellowish green or brown, diameter 2 to 2.5 mm. Pl. 6, fig. 9. Felt '09e, p. 292

Itonid. Caryomyia consobrina Felt

Thin-walled, probably similar to the above. Felt '08e, p. 338

Itonid. Caryomyia arcuaria Felt

Thin-walled, without the nipple of Caryomyia caryae, with a yellowish pubescence, diameter 2 to 4 mm. Felt '09e, p. 292

Itonid. Caryomyia similis Felt

Thin-walled, globose, slightly depressed, with a slight nipple, diameter 3 to 4 mm.

Itonid. Cecidomyia sp.

Thick-walled, yellowish green or brown, diameter 4 to 5 mm. Pl. 6, fig. 1. Felt '09e, p. 292

Itonid. Caryomyia antennata Felt

Thick-walled, irregularly ovate, granulate, a slight nipple, diameter 2 to 3 mm.

Itonid. Cecidomyia sp.

Thin-walled, with a false chamber at the apex, diameter 2 to 3 mm. Felt '09e, p. 292

Itonid. Caryomyia inanis Felt[1]

Globose leaf galls — hairy

Thick-walled, brownish or reddish brown, hairs rather short, curly, diameter 6 to 7 mm. Beutm. '07, p. 393

Itonid. Hickory peach gall, Caryomia persicoides Beutm.

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[1] Wells '15 has characterized several variations in hickory galls having a false apical chamber. They may prove specifically distinct.

Possibly reared from the above gall. Felt '15e, p. 108

Itonid. Rhabdophaga hirticornis Felt

Reared from several Carya galls, probably inquiline. Felt, '07a, p. 141

Itonid. Parallelodiplosis caryae Felt

Thin-walled, rust-red, hairs long, straight, diameter 2 to 4 mm. Pl. 6, fig. 4. Felt '09e, p. 293

Itonid. Hickory onion gall, Caryomyia holotricha O. S.

Gall similar to the above, the midge probably inquiline. Felt '08e, p. 401

Itonid. Mycodiplosis holotricha Felt

Thin-walled, long-haired, melon-shaped, diameter 2 to 3 mm. Pl. 6, fig. 8. Felt '08e, p. 388

Itonid. Caryomyia thompsoni Felt

Thin-walled, with long, brown hairs, globose, diameter 3 to 4 mm, nipple distinct, long on some.

Itonid. Caryomyia sp.

Midrib or vein gall

A rounded, irregular, pale yellowish, hard swelling, 12 mm long. Osten Sacken '62, p. 193

Itonid. Caryomyia cynipsea O. S.[1]

Leaf folds and ridges

Galls either on the main rib or transverse veins, yellowish green, brownish or purplish, two or more confluent, length 6 to 14 mm, diameter 2 to 3 mm. Pergande '04, p. 239

Aphid. Phylloxera caryae-venae Fitch

Globular or irregular, terminating in a toothlike nipple and occurring on tender twigs, petioles or ribs of leaves, often confluent, smooth, diameter 2 to 8 mm. Pergande '04, p. 251

Aphid. Phylloxera perniciosa Perg.

Reniform, petiole or midrib gall, a transverse slit dividing the gall into two halves, diameter 2 to 15 mm. Pergande '04, p. 257

Aphid. Phylloxera caryaeren Ril.

Occurring on leaf, producing no gall

An irregular, yellowish, brown-margined elevation, diameter 3 mm, larva surrounded by a viscid secretion. Osten Sacken '62, p. 193

Itonid. Sticky leaf spot, Caryomyia glutinosa O. S.[1]

Petiole or twig galls

Globular or oval, often more or less conical, spiny or smooth, according to the tree on which they grow, and more or less confluent, diameter 5 to 25 mm. Pergande '04, p. 244

Aphid. Hickory gall aphid, Phylloxera caryaecaulis Fitch

Globular, densely covered with long, fleshy filaments, diameter 5 to 15 mm. Pergande '04, p. 247

Aphid. Phylloxera spinuloides Perg.

[1] The reference of this species to Caryomyia is provisional.

Medium, growing in larger or smaller clusters and apparently deformations of flower and leaf buds, splitting when mature into four or more broad bracts, surface smooth, diameter 3 to 15 mm. Pergande '04, p. 248

Aphid. Phylloxera devastatrix Perg.

Medium, smooth, growing in clusters, usually with a short, stout nipplelike projection on one side, diameter 5 to 10 mm. Pergande '04, p. 249

Aphid. Phylloxera georgiana Perg.

Fig. 48. Cecidomyia sp. Bud gall on Corylus, a1737. (Original)

Fig. 49. Spiny witch-hazel gall aphid, Hamamelistes spinosus Shim. Pseudo galls on birch leaves. (After Pergande)

Large, oval, smooth, growing on the petioles, a slight, central depression covered with short hairs, length 20 mm, diameter 10 mm. Pergande '04, p. 250

Aphid. Phylloxera subelliptica Shim.

Globular or irregular, terminating in a toothlike nipple and occurring on tender twigs, petioles or ribs of leaves, often confluent, smooth, diameter 2 to 8 mm. Pergande '04, p. 251

Aphid. Phylloxera perniciosa Perg.

Reniform, petiole or midrib gall, a transverse slit dividing the gall into two halves, diameter 2 to 15 mm. Pergande '04, p. 257

Aphid. Phylloxera caryaeren Ril.

Swellings in husks

Irregular swellings in the husks, produced by pale reddish larvae. Osten Sacken '70, p. 53

Itonid. Hickory husk midge, Caryomyia nucicola O. S.[1]

Betulaceae (birch family)

Corylus (hazelnut)

Globose, constricted twig swellings, diameter 1.5 cm.

Coleop. Bronze birch borer. Agrilus politus Say

Sterile catkins deformed, swollen basally. Pl. 7, fig. 3. Stebb. '10, p. 16

Itonid. Hazel catkin gall. Cecidomyia squamulicola Stebb.

Slightly swollen, aborted buds, length 4 mm, diameter 3mm. Fig. 48

Itonid. Hazel bud gall. Cecidomyia sp. a1737

Bud deformation checking further development as soon as it has begun to expand. Pl. 15, fig. 5. Chad. '08, p. 131

Acarid. Eriophyes sp.

Red-haired, leaf fold. Felt '15e, p. 193

Itonid. Red plush gall. Lasiopteryx coryli Felt

Reared from same gall. Felt '07a, p. 128

Itonid. Mycodiplosis corylifolia Felt

Ostrya (hop hornbeam)

Terminal folded leaves

Itonid. Cecidomyia sp.

Globose, red-tinted pocket gall, diameter 1–2 mm. Wells '14, p. 293

Acarid. Eriophyes sp.

Carpinus (hornbeam, ironwood)

Reddish leaf fold along lateral veins. Osten Sacken '62, p. 202

Itonid. Hornbeam leaf fold, Cecidomyia pudibunda O. S.

Betula (birch)

Under decaying bark. Felt. '13m, p. 205

Itonid. Miastor americana Felt

From bark of black birch injured by a Sesian

Itonid. Mycodiplosis corylifolia Felt

Under decaying bark. Felt '12f, p. 246

Itonid. Itonida putrida Felt

Under decaying bark, presumably predaceous

Itonid. Lestodiplosis sp.

Crowded, irregular bud deformation, often in large bunches, on B. lutea. Incipient " witches broom " ? Pl. 15, fig. 2. Chad. '08, p. 128

Acarid. Eriophyes sp.

Irregular twig and branch annulations. Felt '06, p. 287

Coleop. Bronze birch borer, Agrilus anxius Lec.

Reared from seeds. Lintn. '96, p. 162

Itonid. Birch seed midge, Oligotrophus betulae Winn.

[1] Generic reference is provisional.

Leaves or parts of leaves thickly corrugated by approximate, lobulate, intervenal swellings. Fig. 49. Felt '06, p. 645

Hemip. Spiny witch hazel gall. Hamamelistes spinosus Shim.

Pocket galls, chiefly on the upper side of the leaf, often confluent. Chad. '08, p. 129

Acarid. Eriophyes sp.

Nodular pocket gall occurring on both leaf surfaces, yellowish or reddish to purplish, on B. papyrifera. Chad. '08, p. 129

Acarid. Eriophyes sp.

A crimson red erineum turning to ochreous in straight, beady lines midway between the ribs or closely bordering them, on B. lenta. Chad. '08, p. 128

Acarid. Eriophyes sp.

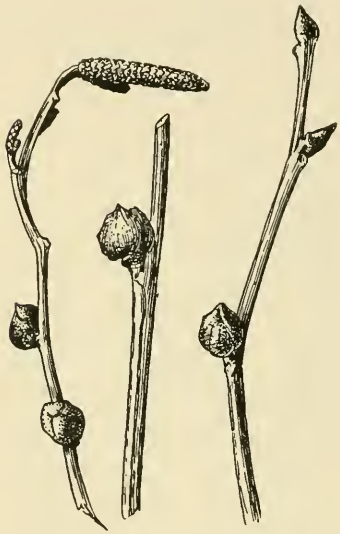

Fig. 50. Alder bud gall, Dasyneura serrulatalæ O. S. (Original)

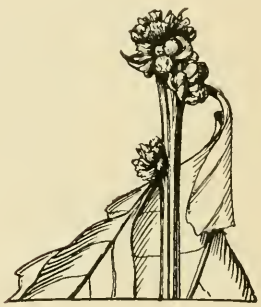

Fig. 51. Chestnut bud gall, Rhopalomyia castaneae Felt. (Original)

A rosy pink erineum in large patches on upper leaf surface, on B. lenta. Chad. '08, p. 128

Acarid. Eriophyes sp.

Small, irregular, mostly elongate, red, crummy leaf patches on B. alba, B. nigra. Chad. '08, p. 128

Acarid. Eriophyes sp.

Yellowish white to brownish erineum, forming large patches on the under surface of the leaf, on B. papyrifera. Chad. '08, p. 129

Acarid. Eriophyes sp.

A bright rusty erineum lining dimples on the under side of the leaf, dark brown or brick red when dry, on B. populifolia. Chad. '08, p. 129

Acarid. Eriophyes sp.

A transparently white, granular erineum on the leaf surface of B. pumila. Chad. '08, p. 129

Acarid. Eriophyes sp.

An erineum with simple trichomes on leaf of Betula sp. Chad. '08, p. 129

Acarid. Eriophyes sp.

Alnus (alder)

Irregularly oval stem swelling, length 5 cm, diameter 1 cm. Felt and Joutel '04, p. 18

Coleop. Alder stem borer, Saperda obliqua Say

Subconical bud gall, diameter 6 to 12 mm. Fig. 50. Felt '15e, p. 186

Itonid. Alder bud gall, Dasyneura serrulatae O. S.

Small, red, pubescent, pocket gall on leaf of A. incana. Pl. 15, fig. 1. Chad. '08, p. 126

Acarid. Eriophyes sp.

Small, remote, pocket gall on upper leaf surface of A. rugosa. Chad. '08, p. 126

Acarid. Eriophyes sp.

Erineum with simple trichomes on leaves of A. alnobetula. Chad. '08, p. 125

Acarid. Eriophyes sp.

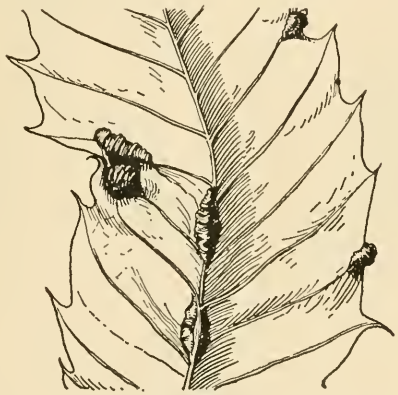

Fig. 52. Cecidomyia sp. Vein gall on chestnut. (Original)

An erineum on leaves of A. ? glutinosa. Chad. '08, p. 125

Acarid. Eriophyes sp.

A white, frostlike erineum on the under side of the leaf in the vein axils, on A. incana. Chad. '08, p. 125

Acarid. Eriophyes sp.

Small, reddish or whitish, flat, woollen patches on the upper leaf surface of A. incana. Chad. '08, p. 126

Acarid. Eriophyes sp.

Fagaceae (beech family)

Fagus (beech)

Sparse, somewhat dimpled, rosy or vinose erineum on under leaf surface, on F. americana. Chad. '08, p. 152

Acarid. Eriophyes sp.

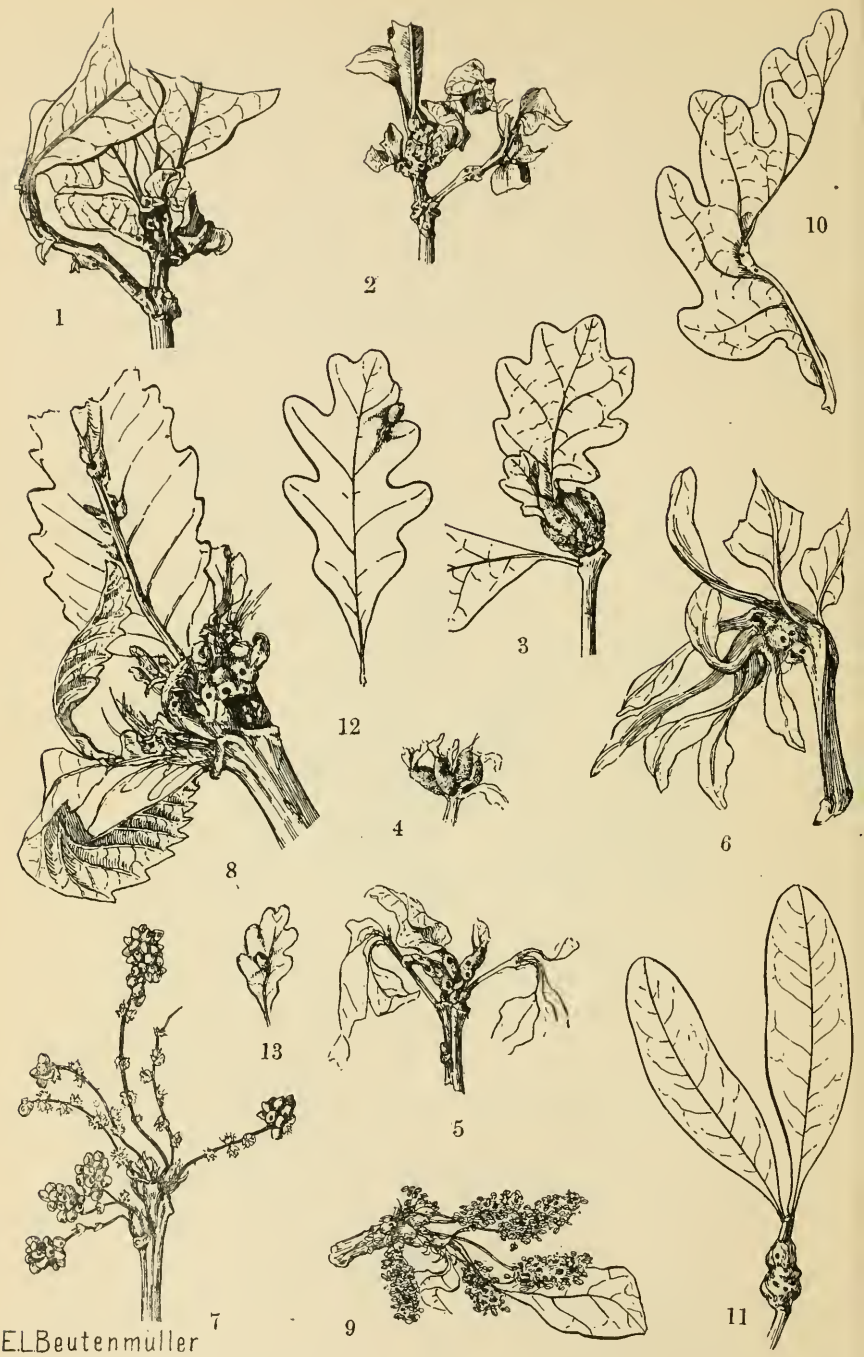

Fig. 53. Neuroterus galls. 1–2. Gall of N. tectus Bass. 3–5. Gall of N. minutus Bass. 6. Gall of N. distortus Bass. 7. Oak flower stem gall, N. pallidus Bass. 8, 9. Gall of N. vernus Gill. 10. Gall of N. pallipes Bass. 11. Gall of N. longipennis Bass. 12, 13. Gall of N. clarkeae Beutm. (After Beutm., Am. Mus. Nat. Hist.)

Golden, rusty or dark brown erineum on the under leaf surface of F. americana. Chad. '08, p. 132

Acarid. Eriophyes sp.

A whitish or golden yellow to brown erineum on the upper leaf surface between or following the veins. Pl. 15, fig. 7. Chad. '08, p. 133

Acarid. Eriophyes sp.

A frosty white erineum in large patches on the under leaf surface of F. sylvatica. Chad. '08, p. 133

Acarid. Eriophyes sp.

Castanea (chestnut)

Under decaying bark. Felt '13m, p. 205

Itonid. Miastor americana Felt

Under decaying bark. Felt '15i, p. 140

Itonid. Winnertzia pectinata Felt

Under decaying bark. Felt '11k, p. 557

Itonid. Itonida pugionis Felt

Under decaying bark. Felt '15i, p. 220

Itonid. Janetiella ligni Felt

Petiole or terminal bud gall. Fig. 51. Felt '09e, p. 229

Itonid. Chestnut bud gall, Rhopalomyia castaneae Felt

Fusiform, ribbed, greenish or brown mid or lateral vein swelling, length 7 to 15 mm, diameter 3 to 5 mm. Fig. 52.

Itonid. Cecidomyia sp.

Globose or hemispherical capsule leaf gall, diameter 2 to 3 mm. Chadwick, '08, p. 130

Acarid. Eriophyes sp.

Galls encircling young twigs and resembling in size and shape egg masses of the forest tent caterpillar. Braun '17, p. 198

Lepid. Ectoedemia castaneae Busck.

Irregular swelling of the burr of C. pumila

Itonid. Cecidomyia chinquapin Beutm.

Irregular swelling of the base of the petiole, dimensions approximately 7 by 10 mm, on C. pumila

Itonid. Cecidomyia sp.

Castanopsis sp. (Western Chinquapin)

Globular, brown, thin-shelled blossom galls, internally soft, pithy, diameter 12 to 24 mm. Beutm. '17, p. 345

Cynipid. Andricus castanopsidis Beutm.

Quercus (oak)

Key to oak galls

1 Root galls, p. 54
2 Gall insects reared from decaying bark or wood, p. 54
3 Galls of branches and twigs, the deformations not separable from the plant (compare with 4, p. 62), p. 54
4 Galls attached to branches and twigs but more or less separated from the normal plant tissues [compare with 3, p. 54 and also with oak apples (10), p. 95], p. 62
5 Gall consisting of one or more larval cells or capsules in a leaf bud, p. 74
6 Galls of the leaves (in some cases a leaf itself is aborted and the gall issues from the twig or bud), p. 78
7 Galls of the aments or catkins, p. 116
8 Galls of the fruits, p. 117

1 *Root galls*

Globose, polythalamous root galls on Q. laurifolia. Beutm. '09, p. 277
Cynipid. Eumayria floridana Ashm.

Irregular, brownish black, globose, dense, pithy root gall, diameter 1.2 cm, on Q. wislizeni Ashm. '97, p. 120
Cynipid. Callirhytis apicalis Ashm.

Irregular, globose, fleshy, polythalamous root swelling, diameter 4 cm or less, on live oak. Ashm. '97, p. 132
Cynipid. Callirhytis rhizoxenus Ashm.

Irregular, polythalamous root gall, diameter 3.5 cm, on Q. minor
Cynipid. Odontocynips nebulosa Kieff.

Polythalamous, fig-shaped, yellowish galls just below the surface of the ground, on Q. alba and Q. minor. Fig. 87, 9, 10. Beutm. '11, p. 354
Cynipid. Oak fig root gall, Dryophanta radicola Ashm.

Irregular, polythalamous, brown, woody root gall on Q. virginiana. Fig. 65, 1. Beutm. '09, p. 278
Cynipid. Belenocnema treatae Mayr.

Irregularly rounded, rugose, fleshy root gall. Ashm. '97, p. 113
Cynipid. Trigonaspis radicis Ashm.

Blisterlike swellings in the smooth bark of the roots, sometimes covering them for a distance of 2 feet or more from the tree, on Q. alba. Bassett '89, p. 237
Cynipid. Callirhytis radicis Bass.

Globose, polythalamous grayish root gall with dimensions up to 3 x 4½ inches. Ent. News, 10:193
Cynipid. Andricus championi Ashm

2 *Gall insects reared from decaying bark or wood*

Reared from larvae under decaying bark. Felt '13m, p. 205
Itonid. Miastor americana Felt

Reared from larvae under decaying bark. Felt '13m, p. 215
Itonid. Leptosyna quercivora Felt

Reared from larvae under decaying bark. Felt '11k, p. 558
Itonid. Itonida cincta Felt

Reared from larvae under decaying bark. Felt '15h, p. 407
Itonid. Parallelodiplosis corticis Felt

3 *Galls of branches and twigs, the deformations not separable from the plant* (Compare with 4, p. 62)

a No visible gall or only a slight swelling. *See also* b–d, e, f, g–h on pages 56, 58, 60 and 61 respectively

Cocoonlike gall, diameter 2.5 mm, hidden in a branch under the bark and with no visible external swelling, on Q. catesbaei. Ashm. '87, p. 145
Cynipid. Andricus cryptus Ashm.

Slight and very inconspicuous enlargements at the base of new shoots, on Q. velutina. Bassett '00, p. 324
Cynipid. Callirhytis cerοpteroides Bass.

Slightly swollen twigs of last summer's growth, on Quercus species. Beutm. '10, p. 126
Cynipid. Neuroterus virgens Gill.

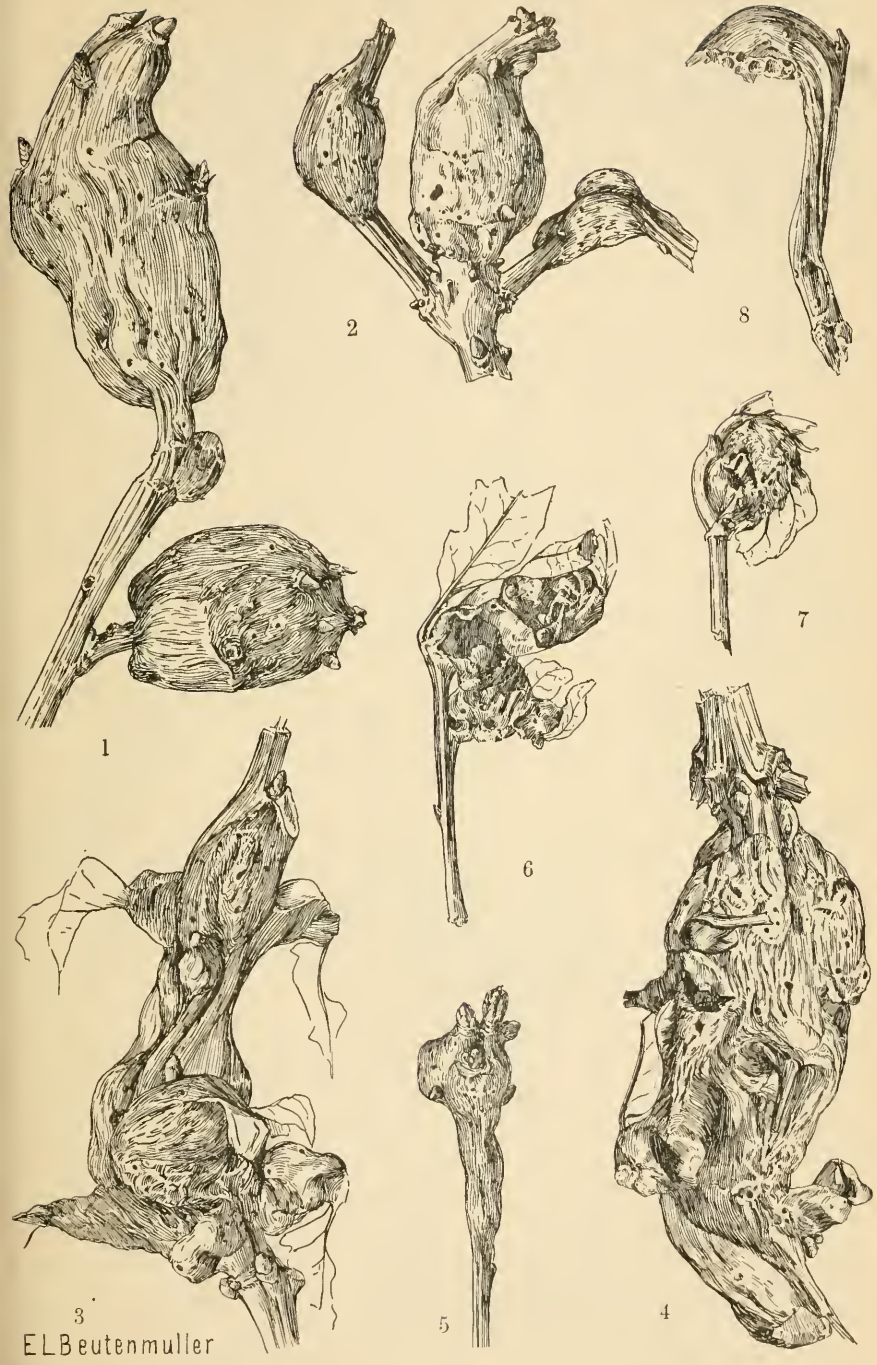

Fig. 54. Oak potato gall, Neuroterus batatus Fitch, 1–6 showing various types of galls. (After Beutm., Am. Mus. Nat. Hist.)

Slight, hardly visible, wavy swellings at the base of tender new shoots, on Q. catesbaei. Ashm. '81, p. XV

Cynipid. Neuroterus catesbaei Ashm.

Elongate twig swelling, length 20 mm, diameter 10 mm, on Q. douglasi. Fullaway '11, p. 345

Cynipid. Cynips kelloggi Full.

Bud-shaped, elongate, pointed apically, thin-walled and hollow. Length 3 to 4 mm, on trunk of white oak. Beutm. '17, p. 347

Cynipid. Andricus gemmiformis Beutm.

Reared from slightly swollen, white oak twigs of Q. alba. Fig. 56. Felt '08e, p. 324

Itonid. Oak twig midge, Lasioptera querciperda Felt

Elongate twig gall, the walls thin, consisting of thickenings of the woody tissues and not visible externally or forming only slight swellings, on Q. pedunculata. Kieff. '10, p. 4

Cynipid. Loxaulus ashmeadi Kieff.

b Twig dwarfed but not specially modified

Irregular, polythalamous swellings in the bud or very young leaves, producing rosettelike clusters of small leaves on Q. platanoides. Fig. 53, 6. Beutm. '10, p. 127

Cynipid. Neuroterus distortus Bass.

Irregular enlargements of the small twigs, on Q. prinoides. Fig. 53, 1, 2. Beutm, '10, p. 126

Cynipid. Neuroterus tectus Bass.

Inconspicuous enlargements of the upper portion of very young, tender shoots, on Q. obtusiloba. Beutm. '11, p. 359

Cynipid. Dryophanta longicornis Bass.

c Twig dwarfed, distorted and forms a short, ovoid mass, polythalamous

Woody, apical swellings 18 to 36 mm long, 12 mm in diameter, on Q. tinctoria and Q. rubra. Pl. 2, fig. 8. Bassett '64, p. 683

Cynipid. Andricus scitulus Bass.

Woody, polythalamous twig gall, length 15 mm, diameter 6 mm, resembles the gall of A. scitulus Bass. and that of A. tectus Bass., on Q. ilicifolia, Q. imbricaria. Bassett '00, p. 311

Cynipid. Andricus tuberosus Bass.

d Twig swollen, dwarfed or distorted into a more or less club-shaped, polythalamous gall

Irregular, potato-shaped, polythalamous, woody leaf or twig gall, green in summer and brown in winter, diameter 1.8 cm, on Q. alba. Fig. 54. Beutm. '10, p. 118

Cynipid. Oak potato gall, Neuroterus batatus Fitch

Irregularly rounded, woody, aborted leaves and buds on young terminal twigs, diameter 4 to 12 mm, on Q. alba. Fig. 81, 3. Beutm. '10, p. 119

Cynipid. Neuroterus consimilis Bass.

Irregular, length 5 to 100 mm, diameter 4 to 25 mm, similar to N. batatus but on the twigs (winter form) or the midrib and petiole of the leaves (spring

Fig. 55. Noxious oak gall, Neuroterus noxiosus Bass. 1-8 showing various types of galls. (After Beutm., Am. Mus. Nat. Hist.)

form), the blade of the leaf dwarfed, curled and shriveled, on Q. platanoides. Fig. 55. Beutm. '10, p. 118

Cynipid. Noxious oak gall, Neuroterus noxiosus Bass.

Globose, hard, corky twig gall, diameter 18 to 20 mm on Q. alba. Osten Sacken '62, p. 255

Cynipid. Cynips juglans O. S.

Irregular, polythalamous, woody twig gall, length 10 cm, diameter 2.5 cm, twigs not more than 4 to 6 mm in diameter. Cal. Trotter '11, p. 113

Cynipid. Andricus sp.

Subglobose, lateral, grayish red or fulvous twig gall, the surface smooth, shining and irregularly warty, diameter 8 to 10 mm. Mex. Trotter '11, p. 126

Cynipid. ? Cynips sp.

Subglobose, polythalamous, solitary or clustered (if the latter more or less fused basally) twig gall, diameter 10 to 15 mm. Mex. Trotter '11, p. 128

Cynipid. ? Cynips sp.

e A swelling surrounding the twig, especially at the base of the lateral shoots, often large, abrupt and woody; potato galls

(1) Not woody or a little woody fiber surrounding the larval cells

Hemispherical, woody, polythalamous knots at the base of young shoots, diameter 12 to 18 mm, larval cells thin-walled, on Q. alba. Bassett '81, p. 76

Cynipid. Loxaulus mammula Bass.

Globose, hard knots, the surface rough, blackened, deeply and irregularly fissured, diameter nearly 2.5 cm, apical on the twig, on Q. ? virens. Bassett '90, p. 75

Cynipid. Callirhytis ruginosus Bass.

Hard, woody knots sometimes terminal on shoots of oak sprouts, more often enlargements at the base of small, lateral branches; terminal galls, diameter 2.5 cm, strawberry-shaped, on Q. castanea. Bass '90, p. 76

Cynipid. Callirhytis seminosus Bass.

Subglobose or reniform, irregular, rather thin-walled, monothalamous, smooth, reddish twig gall, length 4 to 7 mm, diameter 3 to 5 mm. Mex. Trotter '11, p. 126

Cynipid. ? Cynips sp.

(2) Woody fiber abundant, without hornlike projections

Irregular, potato-shaped, polythalamous woody galls, diameter 1.8 cm, on Q. alba. Fig. 54. Beutm. '10, p. 118

Cynipid. Oak potato gall, Neuroterus batatus Fitch

Irregular, globose, frequently confluent twig galls, length 10 cm, diameter 3 cm, on Q. nigra, Q. coccinea, Q. rubra and Q. ilicifolia. Fig. 57. Bassett '63, p. 323

Cynipid. Gouty oak gall, Andricus punctatus Bass.

Abrupt, irregular, potatolike twig or branch swellings, length 10 to 20 mm, diameter 8 mm, on Q. virginiana. Ashm. '81, p. XI

Cynipid. Live oak potato gall, Andricus batatoides Ashm.

Hard, smooth, knotlike twig swellings, diameter 20 mm, on Quercus species. Bassett '81, p. 112; '00, p. 320

Cynipid. Andricus coxii Bass.

Irregularly rounded or elongate, woody, polythalamous twig swellings much like those of A. coxii, on Q. virginiana. Beutm. '09, p. 281

Cynipid. Compsodryoxenus maculipennis Ashm.

Irregular, dense, corky, polythalamous twig swellings, length 4 cm, diameter 1.6 mm, on Q. undulata. Gill. '92, p. 247

Cynipid. Andricus frequens Gill.

A gradual twig or branch swelling 3.6 to 8 cm long and 12 to 24 mm in diameter, on Q. cinerea. Ashm. '85, p. VIII

Cynipid. Andricus medullae Ashm.

Fig. 56. Oak twig midge, Lasioptera querciperda Felt. (Original)

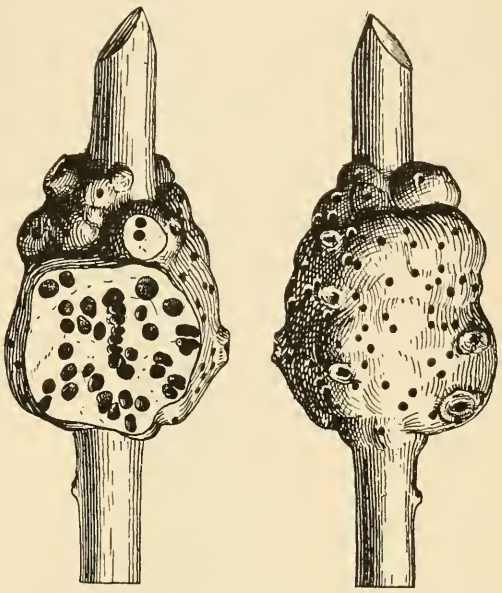

Fig. 57. Gouty oak gall, Andricus punctatus Bass. Old gall and one in section. (Original)

Irregular twig enlargement similar to that of A. medullae, length 1.2 to 3 cm, on Q. chrysolepis. Ashm. '97, p. 124

Cynipid. Callirhytis chrysolepidicola Ashm.

Oblong, irregular, woody swellings on leaf petioles or at the base of the new shoots, length 8 to 9 mm, diameter 3.5 to 4 mm, on Q. laurifolia. Fig. 53, 11. Beutm. '10, p. 125

Cynipid. Neuroterus longipennis Ashm.

Irregularly rounded or elongate, somewhat potato-shaped, polythalamous oak twig gall, length 15 to 30 mm, diameter 14 to 20 mm, on unknown scrub oak. Beutm. '07, p. 464

Cynipid. Andricus wheeleri Beutm.

(3) Larval cells each surrounded by a tube of cellular tissue differentiated from the general substance of the galls; tubes may project from the surface in the matured gall

(*a*) Tubes never project.

Globose or elongate twig and branch gall, length 1.2 to 5 cm, the wood hard, curled, the bark smooth and within concealed, rounded, subcompressed tubes, on Q. agrifolia, Q. chrysolepis. Bass. '81, p. 54

Cynipid. Callirhytis suttoni Bass.

(*b*) Tubes project like horns or spines

Globose twig gall, irregular, woody, variable in size, with many hornlike projections, occurs on Q. palustris, Q. ilicifolia, Q. digitata and Q. nigra. Pl. 1, fig. 9. Osten Sacken '62, p. 251

Cynipid. Horned oak gall, Andricus cornigerus O. S.

Clustered, fifty to one hundred, quadrate or hexagonal tubes somewhat resembling a honeycomb and arising from trunks of young red and scarlet oak, Q. rubra and Q. coccinea Beutm. '11c, p. 197

Cynipid. Honey-comb twig gall, Dryocosmus favus Beutm.

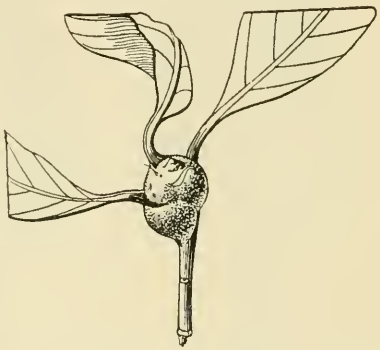

Fig. 58. White oak club gall. Andricus clavulus O. S. (Original)

Abrupt, irregular, woody, tuberlike twig gall, at first smooth, later rough, with deep fissures and spiny, succulent tubes, diameter 12 to 30 mm, on Q. virginiana. Ashm. '81, p. XXVI

Cynipid. Andricus clavigerus Ashm.

f Polythalamous, woody swellings at base of twig, eccentric on twig (grade to last group)

A hard, knotty swelling at the base of small twigs and branches, length 9 to 18 mm, diameter 8 to 10 mm, on Q. aquatica. Ashm. '87, p. 144

Cynipid. Callirhytis aquaticae Ashm.

Globular, irregular, somewhat elongate, single or clustered, polythalamous oak twig galls; individual galls, diameter 4 to 15 mm, the nutlike masses with a diameter of 40 mm, on Q. nana. Beutm. '07, p. 463

Cynipid. Andricus davisi Beutm.

Subreniform, irregular, polythalamous, unilateral twig gall, smooth, shining, yellowish or yellowish brown, length 3 cm, diameter 2 cm. Cal. Trotter '11, p. 111

Cynipid. ? Disholcaspis sp.

g Pustular elevations of the bark, often enlarging the twig

Abrupt, irregular twig swellings varying from round, pustule-like bodies 4 mm in diameter to confluent, polythalamous masses 25 mm long and 12 mm in diameter, on Q. p r i n u s. Fig. 107, 11. Beutm. '10c, p. 120

Cynipid. N e u r o t e r u s r i l e y i Bass.

h Monothalamous terminal enlargements or club galls on twigs

Globe-shaped, apical, woody twig galls, length 12 to 25 mm, on Q. a l b a. Fig. 58, pl. 2, fig. 2. Osten Sacken '65, p. 351

Cynipid. White oak club gall, A n d r i c u s c l a v u l u s O. S.

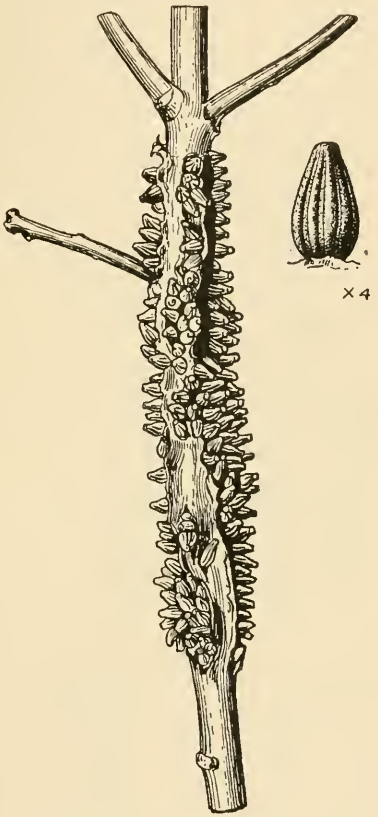

Fig. 59. A n d r i c u s g e m m a r i u s Ashm. Badly infested twig and one gall enlarged. (Original)

Ovate or globose apical twig gall, leafy, diameter 7 to 8 mm, on willow oak. O. S. '61, p. 70

Cynipid. A n d r i c u s[1] p h e l l o s O. S.

[1] Generic reference by Beutenmuller.

Irregular, monothalamous, green twig galls, length 18 mm, diameter 12 mm, when green covered with leaves, on Quercus species. Bassett '90, p. 82

Cynipid. Andricus howertoni Bass.

Club-shaped, woody, apical galls on small limbs, the apex blunt and generally turned to one side. Pl. 2, fig. 9. Bassett '64, p. 685

Cynipid. Scrub oak club gall, Callirhytis similis Bass.

4 *Galls attached to branches and twigs and more or less separated from the normal plant tissues* (Compare with 3, p. 54 and also oak apples (10), p. 95. *See also, b* and *c* on p. 71 and *d* on p. 72.

a Bullet galls, that is woody galls attached to the twigs and in small clusters or solitary

(1) Polythalamous

Subglobular, polythalamous, sessile twig gall, diameter 2 to 6 cm, on Q. lobata. Fullaway '11, p. 346

Cynipid. Andricus californicus Bass.

Globose, polythalamous, sessile twig galls resembling round apples, surface brown, smooth, 2.5 to 5 cm, on Q. agrifolia. Bassett '81, p. 74

Cynipid. Callirhytis pomiformis Bass.

Globose, irregular, yellowish brown to dark brown, mostly smooth and shining, probably twig gall, diameter 1 to 1.5 cm, on Quercus species. Bassett '90, p. 83

Cynipid. Andricus maxwelli Bass.

Globose, irregular, hard, pithy, brown gall, externally finely granulated and with a few short, blunt spines, interior hard, pithy, brown, polythalamous, diameter 8–10 mm. Ashm. '97, p. 117

Cynipid. Andricus murtfeldtae Ashm

Irregular, rugose, yellowish brown, woody, polythalamous, apical twig gall, apparently with a long peduncle or this may be the apex of a leaf petiole, length 2 to 4 cm, diameter 1 to 2 cm, on Q. agrifolia, Q. chrysolepis Ashm. '97, p. 120

Cynipid. Andricus congregatus Ashm.

Clustered, variable, presumably green, soft, succulent galls occurring in leaf axils and about as large as a chestnut or hazelnut. Beutm. '11, p. 354

Cynipid. Dryophanta pumiliventris Bass.

Globose, clustered, polythalamous, buff-colored twig galls, diameter 3 to 5.5 cm, on Q. garryana. Gill. '94, p. 235

Cynipid. Andricus spongiola Gill.

Irregularly rounded, polythalamous, as it ages becoming brown, rugose, fissured, length 55 mm, diameter 3.5 mm, on live oak. Beutm. '13, p. 243

Cynipid. Andricus montezumus Beutm.

(2) Small, monothalamous, without distinct central cell

(*a*) Situated in fissures in the twigs

Irregular, brown, somewhat smooth twig gall arising from a slit and with transverse depressions, indicating coalescence, length 25 mm, diameter 12 mm, on Q. chrysolepis var. vaccinifolia. Fig. 64, 13. Beutm. '09, p. 38

Cynipid. Disholcaspis truckeensis Ashm.

Globose, densely rugose, grayish, slightly flattened twig galls, the rugosites in five or six transverse rows, diameter 2 to 2.5 mm, transverse 3 to 4 mm, the galls

Fig. 60. Oak bullet galls. 1–3. Oak bullet gall, Disholcaspis globulus Fitch. 4–7. D. omnivora Ashm. 8, 9. D. rubens Gill. 10. Mealy oak gall, D. cinerosa Bass. 11. D. succinipes Ashm. (After Beutm., Am. Mus. Nat. Hist.)

clustered in fissures or slits on the terminal twigs, on Q. cinerea. Ashm. '87, p. 143

Cynipid. Andricus difficilis Ashm.

Generally oval, sometimes irregularly shaped, usually smooth, cells filling longitudinal slits or fissures in twigs of Q. rubra. Ashm. '97, p. 121

Cynipid. Andricus excavatus Ashm.

Globose, hard, brown twig galls with a diameter of 7 to 10 mm, occurring several together in fissures in the twigs, on Q. imbricaria and Q. ilicifolia. Ashm. '97, p. 122

Cynipid. Andricus imbricariae Ashm.

Fig. 61. Oak bullet gall, Disholcaspis globulus Fitch. (Original)

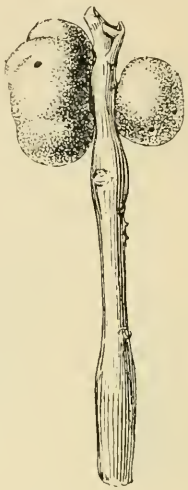

Fig. 62. Disholcaspis omnivora Ashm. (Original)

(*b*) Not inserted in fissures on the twigs

Numerous small, oblong, rugose, budlike galls surrounding the twig, sometimes issuing from the sides of the larger branches, length 2.5 to 3 mm, on Q. cinerea. Fig. 59. Ashm. '85, p. IX

Cynipid. Andricus gemmarius Ashm.

Oblong, oval, longitudinally ribbed, brown galls without a distinct cell, dehiscent, arising in clusters of two to three in bud axils, on Q. cinerea. Ashm. '87, p. 142

Cynipid. Jumping ribbed gall. Andricus saltatus Ashm.

Ellipsoidal, smooth, monothalamous, snuff-colored twig galls, length 5 to 7 mm, on Q. garryana. Gill. '94, p. 235

Cynipid. Callirhytis washingtonensis Gill.

Small, round, monothalamous twig galls, smooth, when dry wrinkled and resembling pepper corns, diameter 5 mm, on Q. alba. Bassett '90, p. 81

Cynipid. Andricus indistinctus Bass.

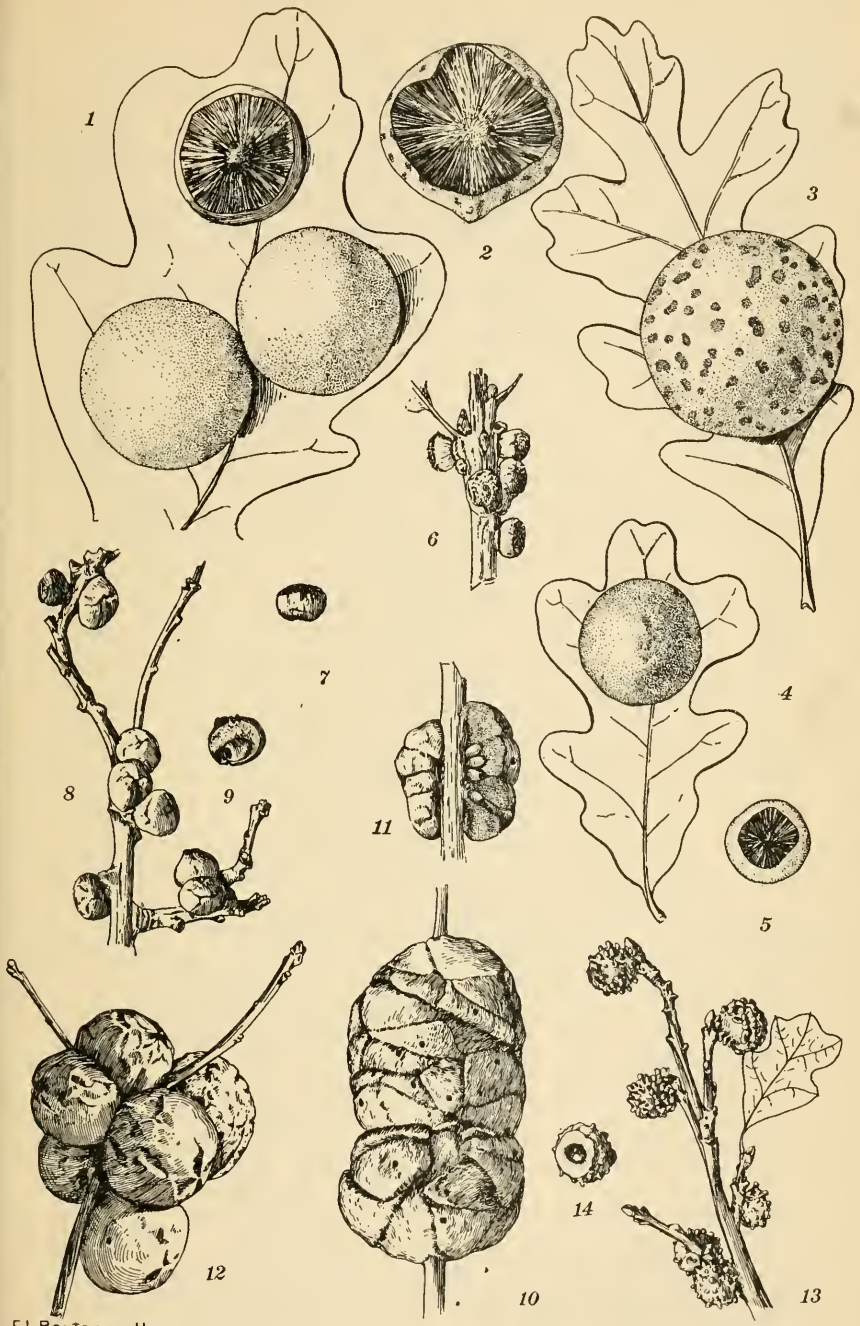

Fig. 63. Oak bullet galls. 1. Dryophanta centricola O. S. 2, 3. Cynips maculipennis Gill. 4, 5. Disholcaspis brevipennata Gill. 6, 7. D. eldoradensis Beutm. 8, 9. D. perniciosa Bass. 10, 11. D. spongiosa Karsch. 12. Oak bullet gall, D. globulus Fitch. 13, 14. Studded oak gall, Cynips corallina Bass. (After Beutm., Am. Mus. Nat. Hist.)

Subcylindrical, rounded apically, smooth, shining, translucent twig gall, height 8 mm, diameter 6 mm. Mex. Trotter '11, p. 128

Cynipid. ? Cynips sp.

(3) Typical bullet galls of a pithy or woody substance with a central cell in which the larva lives. This may be closely attached to the substance of the gall or fill a larger or smaller cavity within the gall.

(*a*) Globular or subglobular in shape

Globular, single or clustered, yellow, sometimes tinged with red, twig gall, diameter 8 to 16 mm, on various oaks. Fig. 60, 1–3, 61, 63, 12. Beutm. '09, p. 29

Cynipid. Oak bullet gall, Disholcaspis globulus Fitch

Globular, single or clustered, pale brown or yellowish, sometimes tinged with red, twig gall, diameter 8 to 20 mm, on various oaks. Beutm. '09, p. 31. Fig. 60, 4–7, 62

Cynipid. Disholcaspis omnivora Ashm.

Globose, milk-white or pale greenish, white-specked and marbled with green or lilac, oak twig gall, fleshy when fresh, becoming woody, dry and hollow, diameter 3 to 6 mm, on white oak and post oak. Beutm. '11b, p. 70

Cynipid. Marbled oak gall, Andricus pisiformis Beutm.

Globose, monothalamous, very hard, corky twig galls, diameter 9 to 15 mm, on Q. agrifolia. Bassett '81, p. 53

Cynipid. Callirhytis agrifoliae Bass.

Globose, with a pointed apex and the sides longitudinally grooved, a rose colored, monothalamous twig gall. The base imbedded in the twig resembles a very small seed onion, length 5 to 8 mm, diameter 4 to 5 mm, on black oak. Beutm. '11b, p. 69, '17, p. 348

Cynipid. Oak onion gall, Biorhiza caepulaeformis Beutm.

Globose, monothalamous, probably twig galls, the surface covered with a mealy, grayish powder, diameter 18 to 24 mm, on Quercus species. Bassett '81, p. 110

Cynipid. Andricus cinerosus Bass.

Globose, linear, clustered, mottled, light and dark green, monothalamous twig galls, diameter 6 to 12 mm, on Q. ilicifolia. Bassett '00, p. 328

Cynipid. Disholcaspis fasciata Bass.

Globose, smooth, corky, reddish brown twig or acorn gall, with a large central cell, diameter 8 to 12 mm, on Q. laurifolia. Fig. 111, 6, 7. Beutm. '09b, p. 63.

Cynipid. Amphibolips fuliginosa Ashm.

Globular, with a blunt point at the apex, hard and resembling small, dark-colored galls of D. globulus, the central cell not separating, length 10 mm, diameter 8 mm. Beutm. '09a, p. 35

Cynipid. Disholcaspis colorado Gill.

Globose, smooth or rough, light straw, usually red-tinted twig gall, diameter 10 to 14 mm, on Q. undulata. Fig. 60, 8, 9. Beutm. '09a, p. 32

Cynipid. Disholcaspis rubens Gill.

Globose, rugose, with raised lines and ridges, diameter 7 mm, on Q. marilandica. Fig. 64, 15, 16. Beutm. '09a, p. 33.

Cynipid. Disholcaspis persimilis Ashm.

Globose, rugose, monothalamous, dark brown twig galls, diameter 8 mm, of the cell 2 mm, occurring in clusters of 10 to 12, sometimes irregular, on Q. lobata. Fullwy. '11, p. 343

Cynipid. Cynips multipunctata Fullwy. (not Beutm.)

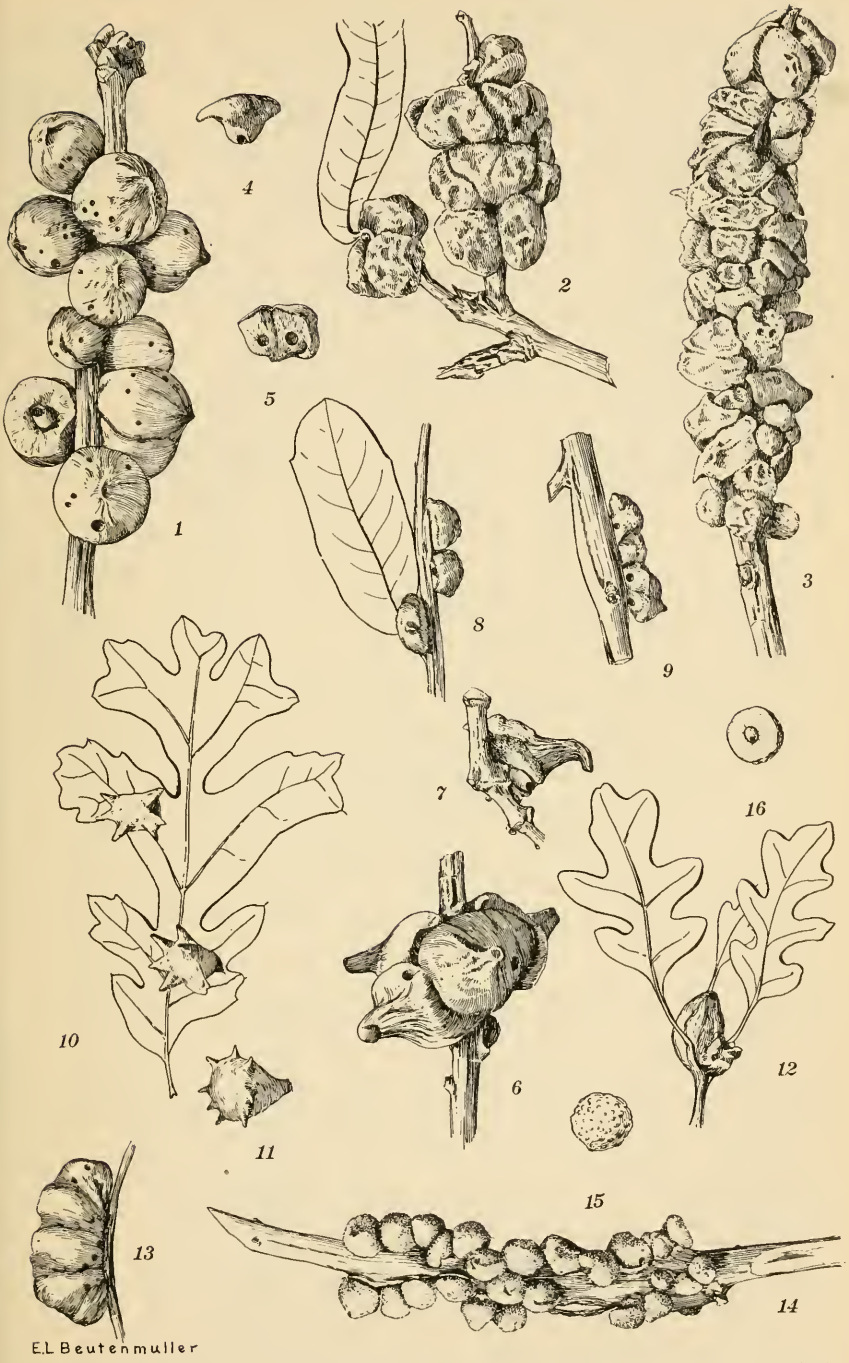

Fig. 64. Oak bullet galls. 1. Rough bullet gall, Disholcaspis mamma Walsh. 2–5. Woolly fig gall, D. ficigera Ashm. 6, 7. D. bassetti Gill. 8, 9. D. chrysolepidis Beutm. 10, 11. Spined turban gall, D. douglasii Ashm. 12. D. sileri Bass. 13. D. truckeensis Ashm. 14. D. succinipes Ashm. 15, 16. D. persimilis Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globular, thick-shelled, slightly nippled twig gall, green, becoming brown, diameter 14 to 17 mm, on Q. marilandica. Fig. 88, 3–5. Beutm. '09b, p. 60

Cynipid. Amphibolips globulus Beutm.

Globose, clustered, bluntly spurred twig gall resembling small specimens of D. mamma though the surface is more hoary, internally a larval cell attached but readily separated from the gall, diameter 10 mm, on dwarf oak, Q. douglasi. Fullaway '11, p. 342

Cynipid. Cynips canescens Bass.

Globose, reddish, buff-colored twig gall, irregularly and thickly studded with short, stout spurs, monothalamous, diameter 7 to 12 mm, on dwarf oak, Q. douglasi. Fig. 63, 13, 14, Beutm. '09a, p. 37

Cynipid. Studded oak gall, Cynips corallina Bass.

Globular, thin-shelled, yellowish, pink or red-tinged, clustered twig gall, within a larval cell supported by radiating fibers, diameter 20 to 40 mm, on Q. reticulata. Beutm. '11a, p. 86

Cynipid. Disholcaspis weldi Beutm.

Clustered, globose or bud-shaped, yellowish brown, later turning black, diameter 3 to 6 mm, on Q. virginiana. Fig. 60, 11, 64, 14. Beutm. '09a, p. 40

Cynipid. Disholcaspis succinipes Ashm.

Single or clustered, globose, nippled twig gall covered with a dense, mealy powder, within a partly free larval cell, diameter 12 to 22 mm, on Q. virginiana. Fig. 60, 10. Beutm. '09a, p. 36.

Cynipid. Mealy oak gall, Disholcapsis cinerosa Bass.

Globose, brownish yellow twig gall, the apex sometimes accuminate, diameter 6 to 16 mm, on Q. chrysolepis. Ashm. '97, p. 118

Cynipid. Andricus pacificus Ashm.

Irregular, somewhat rounded twig gall, the sides flattened, slightly oblique, ridged around the upper part of the sides, the apex rounded, occurs singly or in rows, usually closely pressed together, diameter 5 to 10 mm, height 4 to 7 mm, on Q. chrysolepis. Fig. 64, 8, 9. Beutm. '11b, p. 68

Cynipid. Disholcaspis chrysolepidis Beutm.

Globose, yellowish brown or dark brown, sometimes mottled with purple and brown, the interior hard and containing a small larval cell, diameter 3 to 4 mm, on Q. wislizeni. Ashm. '97, p. 119

Cynipid. Andricus wislizeni Ashm.

Ovate or globular, nippled, presumably twig gall containing a central larval cell and covered with a dense, fine, short pubescence, diameter 5 to 8 mm, on Q. chrysolepis. Ashm. '97, p. 119

Cynipid. Andricus chrysolepidis Ashm.

Globose, slightly nippled, wrinkled, with many short, spinelike projections, light yellowish brown, some of the spines tipped with pink, diameter 20 mm, on Q. chrysolepis. Beutm. '11c, p. 211

Cynipid. Andricus yosemite Beutm.

Globose, densely woolly, peach-like twig gall. Diameter 22 to 50 mm. Beutm. '17, p. 348

Cynipid. Amphibolips nigra Beutm.

Oblate, pale brown, broadly attached twig gall, diameter 4 to 7 mm, height 4 mm, on Q. kelloggii. Fig. 63, 6, 7. Beutm. '09a, p. 38

Cynipid. Disholcaspis eldoradensis Beutm.

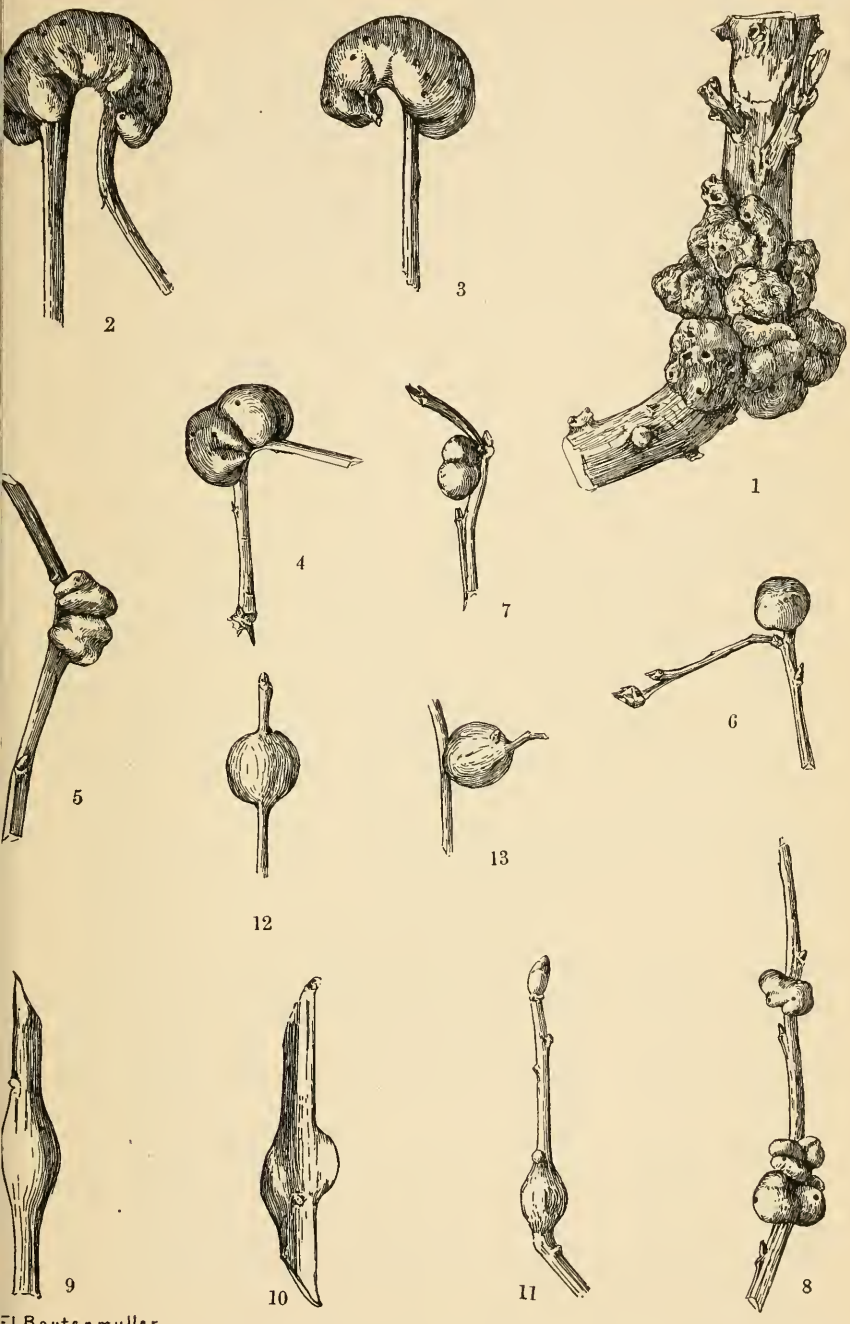

Fig. 65. 1. Oak fig root gall, Belenocnema treatae Mayr. 2–8. Blueberry stem gall, Solenozopheria vaccinii Ashm. 9–13. Compsodryoxenus brunneus Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globose, apical, somewhat pointed, crimson or scarlet, turning a dark brown, monothalamous, diameter 5 to 8 mm, on Q. undulata and Q. gambellii. Fig. 63, 8, 9. Beutm. '09a, p. 39

Cynipid. Disholcaspis perniciosa Bass.

Globose or irregular, clustered, woody, clay-brown or reddish tinged, twig galls, diameter of mass 30 mm, of individual galls 8 to 18 mm. Beutm. '11a, p. 87

Cynipid. Disholcaspis mexicana Beutm.

Globose, solitary, woody, thin-shelled twig gall, the tip frequently slightly pointed, the base somewhat excavated and partly surrounding the twig, pale orange, with short, gray hairs, internally a small basal cell, diameter of gall 12 to 15 mm. Ore. Trotter '11, p. 102

Cynipid. Andricus sp.

Globose, woody, solitary or clustered twig gall with a short stem, the dry galls of the same color as the twig, diameter 7.9 mm, of the cell 4 mm. Ore. Trotter '11, p. 102

Cynipid. Callirhytis sp.

(*b*) Form more ovoid, with a point at the apex

Globose, obscurely pointed, green, bright red, turning to brown or dark red, diameter 6 to 18 mm, on Q. platanoides, Q. macrocarpa. Fig. 64, 1. Beutm. '09a, p. 31

Cynipid. Rough bullet gall, Disholcaspis mamma Walsh

Ovate, green, becoming brown, bud gall usually with leaves growing from the sides and internally a closely imbedded though separate larval cell, length 9 mm, diameter 5 to 6 mm, on Q. undulata. Fig. 64, 12. Beutm. '09a, p. 34

Cynipid. Disholcaspis sileri Bass.

Globose gall covered with very fine, short, grayish pubescence and somewhat pointed at the apex; the larval cell occupies most of the gall, diameter 5 mm. Ashm. '97, p. 122

Cynipid. Andricus perplexus Ashm.

Irregularly pyriform twig gall with a bent point apically, diameter 1 cm, on Q. macrocarpa. Karsch '80, p. 291

Cynipid. Andricus macrocarpae Karsch

(*c*) Form more or less conical

Hard, conical, black or brownish black galls issuing from the bud axils on the larger branches, the apex sometimes curved, dimensions 12 by 6 mm, on Q. laurifolia, Q. phellos. Ashm. '81, p. XXVI

Cynipid. Andricus coniferus Ashm.

Irregular, somewhat triangular, hard, finely rugose, blackish, seedlike twig gall, mostly covered with a whitish bloom. Ashm. '97, p. 130

Cynipid. Callirhytis crassicornis Ashm.

Conical, clustered twig or branch gall, often deep red, becoming when dry, brown or black, length 12 to 18 mm, on Q. ilicifolia. Pl. 1, fig. 8. Bassett '64, p. 68

Cynipid. Andricus ventricosus Bass.

Globose, usually with a produced, curved apex, single or clustered twig gall, green turning to brown, on Q. platanoides, Q. imbricaria. Fig. 64, 6, 7. Beutm. '09, p. 33

Cynipid. Disholcaspis bassetti Gil.

(*d*) Not globular or conical

Very hard, ovate or elongate, woody, polythalamous twig swelling on Q. chrysolepis. Fig. 65, 9–13. Beutm. '09e, p. 281

Cynipid. Compsodryoxenus brunneus Ashm.

Globo-cylindrical, cellular twig galls attached by a broad base and with cuplike expansions, yellowish or greenish brown, frequently black and dirty, diameter 6 mm, on scrub oak. Gillette '93, p. 30, Beutm. '09a, p. 39

Cynipid. Disholcaspis perniciosa Bass.

Ovate or budlike, monothalamous, green or red, fleshy gall on trunks of young trees or stems of very young shoots, length 5 to 6 mm, diameter 3 to 3.25 mm, on Q. rubra, Q. velutina. Beutm. '11e, p. 211

Cynipid. Andricus rugulosus Beutm.

(4) Woody, a central kernel and the outer substance of the gall chambered, clustered

Clustered, elongate, fusiform, monothalamous twig galls, the interior corky, filamentaceous, length 1.5 to 2 cm, diameter 1 cm, on Q. rubra, Q. cinerea Q. coccinea. Pl. 3, fig. 2. Bassett '64, p. 679

Cynipid. Andricus formosus Bass.

b Galls distinctly woody, with the structure of typical bullet galls and clustered in compact and characteristic masses about the supporting twig

Clustered, compressed, somewhat fig-shaped, yellowish brown twig galls covered with a feltlike substance, on Q. virginiana. Fig. 64, 2–5. Beutm. '09a, p. 40

Cynipid. Woolly fig gall, Disholcaspis ficigera Ashm.

Closely compressed clusters of twig galls covered with a rust-colored, velvety substance, spongy internally, reddish brown, length of masses 25 to 50 mm, diameter 16 to 38 mm, on Q. macrocarpa, Q. minor and Q. chapmani. Fig. 63, 10, 11. Beutm. '09a, p. 41.

Cynipid. Disholcaspis spongiosa Karsch

Clustered, dark reddish brown twig gall, the mass resembling an irregular nubbin of red dent corn, on Q. virginiana. Bassett '00, p. 329

Cynipid. Loxaulus spicatus Bass.

Globose twig enlargement, diameter 12 mm, composed of a series of monothalamous, brown, wedge-shaped, closely fitted cells, on Q. bicolor, Q. macrocarpa. Pl. 3, fig. 5. Osten Sacken '62, p. 254

Cynipid. Lobed oak gall, Cynips strobilana O. S.

Rounded or crown-shaped, monothalamous, pale green twig gall, soft when fresh, becoming hard after drying, thick-walled, diameter 6 to 12 mm, length 8 to 12 mm, on Q. palustris, Q. aquatica. Beutm. '07, p. 464

Cynipid. Andricus coronus Beutm.

c Galls in compact cluster around the twig but bladderlike and not woody as in the last group

Numerous soft, thin-shelled, yellow, red or brown twig galls frequently closely pressed together and somewhat resembling figs, on Q. alba, Q. prinoides and Q. prinus. Fig. 66, 84, 1, 2. Beutm. '09d, p. 244

Cynipid. Oak fig gall, Biorhiza forticornis Walsh

d Galls on twigs, consisting of fibrous material which conceals one or more cells containing larvae

(1) Cells large, solitary or clustered

Elongate or oblong, woody, tubelike twig gall resembling a date seed, sessile on the branch and covered with long, brownish yellow wool, length 2 cm, diameter 5 to 7 mm, on Q. chrysolepis. Ashm. '97, p. 117

Cynipid. Woolly tube gall, Andricus dasydactyli Ashm.

Elongate, irregular, hard, woody cell, broadly attached to the twig and covered with a compact mass of white, woolly substance sometimes tinged with red or brown, length 15 to 20 mm, diameter 12 to 20 mm, on Q. minor. Beutm. '09f, p. 248

Cynipid. Andricus aciculatus Beutm

Fig. 66. Oak fig gall, Biorhiza forticornis Walsh. (Original)

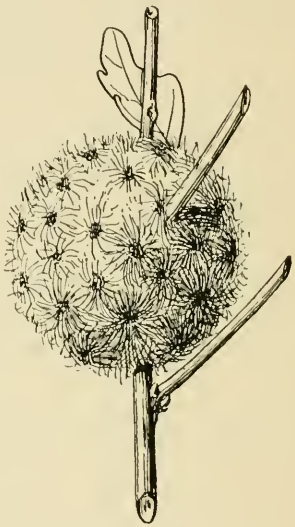

Fig. 67. Wool sower, Andricus seminator Harr. (Original)

(2) Cells small, numerous, massed in a cluster beneath the fibers

Globular white, pinkish marked, woolly growth containing seedlike grains and occurring on twigs in June, diameter 2.5 to 4 cm, on Q. alba. Fig. 67. Walsh '70, p. 71

Cynipid. Wool sower, Andricus seminator Harr.

Among the fibers of fresh Andricus seminator galls

Itonid. Cecidomyia sp.

Round, woolly twig gall containing seedlike grains and closely resembling that of C. seminator Harr., on Q. nigra. Osten Sacken '62, p. 256

Cynipid. Callirhytis operator O. S.

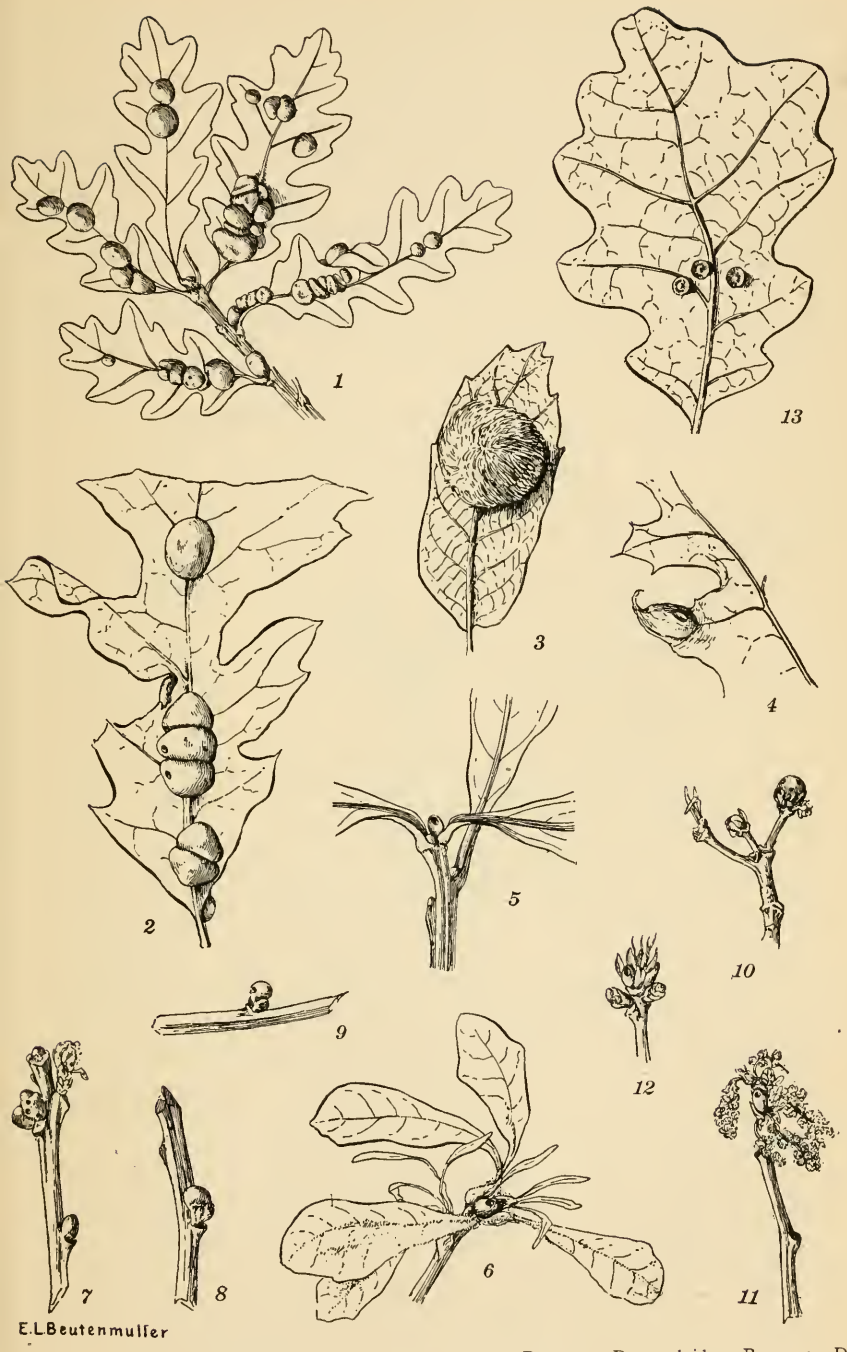

Fig. 68. Dryophanta galls. 1, 2. D. eburnea Bass. 3. D. nubila Bass. 4. D. notha O. S. 5, 6. Threaded oak gall, D. pallipes Bass. 7–10. D. clarkei Bass. 11, 12. Hard oak bud gall, D. gemula Bass. 13. D. discus Bass. (After Beutm., Am. Mus. Nat. Hist.)

Ovate, haired twig gall consisting of 20 to many irregularly fusiform cells, apically haired, forming gray, brown masses, on Q. macrocarpa. Karsch '80, p. 291

Cynipid. Andricus setifer Karsch

Large twig gall composed of a woolly mass having a diameter of 85 to 60 mm and encircling twigs 5 mm in diameter, each mass composed of from few to many cells and covered with long, white wool. Beutm. '13, p. 132

Cynipid. Callirhytis furnessae Weld.

Irregular, globose, brownish yellow twig gall, smooth above, tomentose below, length 2.5 cm, diameter 12 mm. Mayr. '05, p. 571

Cynipid. Andricus bonanseae Mayr.

Woolly twig gall composed of numerous haired cells, white, blended with rose and later rusty red, diameter 1 to 3 cm. Mex. Trotter '11, p. 127

Cynipid. ? Callirhytis sp.

5 *Gall consisting of one or more larval cells or capsules in a leaf bud*

a Hard cell or cells surrounded by a number of modified leaves. *See also* b, c, d on pages 75 and 76.

(1) Cells surrounded by a few threadlike bodies

Oblong, oval, thin-shelled, blackish brown galls among the thrifty young buds and surrounded by six or more long, brown, threadlike bodies, length 2.5 mm, diameter 1.5 mm, on Q. alba. Fig. 68, 5, 6. Bassett '00, p. 327

Cynipid. Threaded oak gall, Dryophanta pallipes Bass.

(2) Cells surrounded by a rosette of linear leaves

Conical, axillary leaf bud gall covered with a dense, rosettelike cluster of aborted leaves, cell oval, length 3 mm, on Q. prinoides. Fig. 69, pl. 3, fig. 3. Bassett '64, p. 688

Cynipid. Oak rosette gall, Cynips frondosa Bass.

Dormant bud galls covered with short fuzzy abortive leaflets and occurring in clumps on trunks of Spanish oak (Q. digitata) and blue jack oak (Q. brevifolia). Beutm. '17, p. 349

Cynipid. Dryophanta floridensis Beutm.

Urn-shaped bud gall with numerous lanceolate, leaflike spines, diameter 12 to 18 mm, middle cell brownish, length 3.5 to 4 mm, diameter 2 to 2.5 mm, on Q. prinoides, Q. alba and Q. macrocarpa. Pl. 1, fig. 3. Ashm. '81, p. XII

Cynipid. Leafy oak gall, Andricus foliatus Ashm.

Small, brown, acorn-shaped gall issuing from a bud axil and surrounded basally by small, narrow, dense leaflets, the cell ovate, diameter 3.75 by 2.5 mm, on Q. obtusiloba. Ashm. '87, p. 136

Cynipid. Andricus stropus Ashm.

(3) Several cells surrounded by a rosette of aborted leaves

A rosette cluster of dense, narrow leaflets springing from a bud, cells, length 3 mm, diameter 2 mm, on Q. macrocarpa Ashm. '87, p. 136

Cynipid. Andricus topiarius Ashm.

Conical, axillary leaf bud gall covered with a dense, rosettelike cluster of aborted leaves, cell oval, length 3 mm, on Q. prinoides. Fig. 68, pl. 3, fig. 3. Bassett '64, p. 688

Cynipid. Oak rosette gall, Cynips frondosa Bass

Polythalamous bud galls surrounded by a thick, compact leaf cluster, on Q. lobata. Fullaway '11, p. 353

Cynipid. Andricus wiltzae Fullw.

Irregularly rounded or ovate, woody, polythalamous swellings with aborted leaves, on Q. minor. Fig. 85, 8. Beutm. '10c, p. 120

Cynipid. Neuroterus obtusilobae Karsch

b A hard cell in the bud and no circle of modified leaves

Rounded or oval, monothalamous, blackish, flower or leaf bud gall, length 2.5 mm, diameter 1.25 mm, on Q. prinoides. Fig. 68, 11, 12. Beutm. '11d, p. 358

Cynipid. Hard oak bud gall, Dryophanta gemula Bass.

Smooth, thin-shelled, globular gall, diameter 2 to 3 mm, arising from a bud and occasionally inclosed by bud scales, on Q. laurifolia. Ashm. '87, p. 141

Cynipid. Andricus calycicola Ashm.

Fig. 69. Oak rosette gall, Cynips frondosa Bass. (Original)

Fig. 70. Neuroterus minutus Bass., snowing aborted leaves. (Original)

Fig. 71. Neuroterus minutus Bass., showing several galls on a slightly deformed leaf. (Original)

c A soft capsule in the bud and no modified leaves

A smooth, reddish brown vesicle in the center of the bud of Q. alba and surrounded at the base by bud scales, color pale greenish brown, on Q. alba, Q. bicolor, Q. prinoides, Q. platanoides and Q. macrocarpa. Fig. 81, 4–9. Beutm. '10e, p. 131

Cynipid. Soft oak bud gall, Neuroterus vesiculus Bass.

Reddish vesicles on the terminal growing point of buds and bud scales. Triggerson '14, p. 4

Cynipid. Cynips erinacei Mayr.[1]

[1] The better known agamic form is Philonix erinacei Mayr., see p. 94

Polythalamous, small, round, brown, thin-walled bud gall, diameter 3 mm, on Q. alba, Q. minor, resembles gall of D. vesiculus. Fig. 68, 7–10. Beutm. '11d, p. 368

Cynipid. Dryophanta clarkei Bass

Conical bud gall, length 8 to 12 mm, diameter 4 to 5 mm, on Q. parvifolia. Ashm. '87, p. 137

Cynipid. Andricus cinnamomeus Ashm.

Small, thin, completely concealed capsules occurring singly in buds of Q. undulata. Gill. '92, p. 247

Cynipid. Andricus cellularius Gill.

d Capsules in the bud, blasting it completely or so that only a few deformed and imperfect leaves appear

Polythalamous, small, round, brown, thin-walled bud gall, diameter 3 mm, on Q. alba, Q. minor, resembles gall of D. vesiculus. Fig. 69, 7–10. Beutm. '11d, p. 368

Cynipid. Dryophanta clarkei Bass.

A minute, round, thin-shelled gall in apparently normal, young buds of post oak, diameter 1 mm. Beutm. '13, p. 247

Cynipid. Dryophanta cressoni Beutm.

Globose, whitish, smooth and glabrous apically, polythalamous bud gall, within whitish, spongy, diameter 22 mm, on Q. agrifolia. Fullaway '11, p. 358

Cynipid. Callirhytis maculipennis Kieff.

Oblong, oval, longitudinally ribbed, brown galls without a distinct cell, occurring in groups of two or three and issuing from bud axils, on Q. cinerea. Ashm. '87, p. 142

Cynipid. Jumping ribbed gall, Andricus saltatus Ashm.

Clustered, globular, woolly bud capsules, apical or axillary, the clusters with a diameter of 6 to 8 mm. Beutm. '10c, p. 132

Cynipid. Neuroterus congregatus Gill.

Rounded, monothalamous bud gall, diameter 10 mm, yellowish, woolly, within a thin-shelled cell with a diameter of 4 mm, on Q. wislizeni. Fullaway '11, p. 359

Cynipid. Callirhytis eriophora Kieff.

Globose, opaque, yellowish, sparsely brown-spotted, glabrous apically, monothalamous bud gall, diameter 8 mm, within spongy and a thick-shelled cell, the latter with a diameter of 5 mm, on Q. agrifolia. Fullaway '11, p. 359

Cynipid. Callirhytis clarimontis Kieff.

Oval bud gall, smooth, glabrous, ligneus, length 13 mm, diameter 11 mm, apically with a thin, longitudinally striated, thick and more or less bent point about 8 mm long and 1.5 mm thick, on Q. chrysolepis. Fullaway '11, p. 360

Cynipid. Callirhytis bakeri Kieff.

Irregular, oval bud gall, the leaflets hardly extending from the buds. Pl. 16, fig. 5. Thompson '15, p. 98

Acarid. Eriophyes sp.

Globose, yellowish brown, polythalamous bud gall with numerous irregular, longitudinal and transverse ridges or tuberosities, diameter 40 mm, apically with a conical spur and having a length of 5 mm, internally numerous oval cells, on Q. chrysolepis. Fullaway '11, p. 361

Cynipid. Callirhytis rossi Kieff.

Globose, monothalamous, thin-shelled bud gall, green, turning brown or gray, imbedded in short, lanceolate, aborted leaves more or less concealing the gall, diameter 3 mm, on Q. platanoides. Beutm. '13f, p. 124

Cynipid. Andricus flavohirtus Beutm.

Globular or elliptical, grayish red, woody bud gall, the apex slightly pointed, length 10 to 14 mm, diameter 6 to 9 mm. Cal. Trotter '11, p. 113

Cynipid. ? Cynips sp.

Subglobose, monothalamous, yellowish bud gall, diameter 2 to 3 cm, diameter of cell 6 mm. Mex. Trotter '11, p. 127

Cynipid. ? Cynips sp.

Fig. 72. Oak leaf stalk gall, Andricus petiolicola Bass. (Original)

Fig. 73. Cecidomyia sp. Vein gall on oak. (Original)

Ovate bud gall, the surface with numerous reddish scales, length 10 to 12 mm, diameter 7 to 8 mm. Wash. Trotter '11, p. 113

Cynipid. Andricus sp.

Subglobose lateral bud gall, diameter 8 to 15 mm. Cal. Trotter '11, p. 111

Itonid. Cecidomyia sp.

Bud gall composed of a basal, oblate part with a height of 3 to 4 mm and a conico-pyramidal portion with a height of 10 to 12 mm and a diameter of 8 to 12 mm, the larval cell in the basal portion, resembles D. bassetti. Cal. Trotter '11, p. 109

Cynipid. ? Disholcaspis sp.

6 *Galls of the leaves (in some cases the leaf itself is aborted and the gall issues from the twig or bud)*

a Galls on the petiole of the leaf

Irregularly globose petiole gall about the size and color of a large, dry pea, on live oak. Ashm. '97, p. 123

Cynipid. Cynips sulcatus Ashm.

Globose, somewhat pubescent, monothalamous, brownish gall with a hard outer shell and a spongy interior, diameter 5 to 6 mm, on under surface of leaf on Q. alba. Fig. 97, 4. Beutm. '11d, p. 346

Cynipid. Dryophanta carolina Ashm.

Globular, below ochreous, not shining petiole leaf gall, internally brown, fibrous, with at least two cells, diameter 9 mm, on Q. arizonica. Beutm. '09a, p. 35

Cynipid. Disholcaspis arizonica Ckll.

Fig. 74. Cecidomyia sp. on black oak, a2296. An older gall, possibly different from the preceding. (Original)

Polythalamous, irregular, clustered swellings of the petiole and midrib covered with pinkish pubescence, on Q. alba. Fig. 53, 3–5, 70, 71. Beutm. '10c, p. 127

Cynipid. Neuroterus minutus Bass.

Irregular swellings of the petiole, midrib or portions of the catkins dwarfing the growth, on Q. macrocarpa. Fig. 53, 8, 9. Beutm. '10c, p. 128

Cynipid. Neuroterus vernus Gill.

b Gall a swelling of the midvein or sometimes of the petiole (See also (13) p. 106, and (15) a, b, p. 110)

(1) Swellings abrupt

Globose or spindle-shaped, woody, green petiole or midrib gall on Q. alba, Q. prinus, Q. macrocarpa, Q. bicolor, Q. prinoides, Q. obtusiloba. Fig. 72. Bass. '63, p. 324

Cynipid. Oak leaf stalk gall, Andricus petiolicola Bass.

Polythalamous, midvein gall projecting on both surfaces, rounded beneath, conical above, length 19 to 22 mm, diameter 12 mm, on Q. alba. Pl. 1, fig. 1. Bass. '90, p. 80

Cynipid. Andricus cicatriculus Bass.

Irregular, polythalamous, reddish brown, woody thickening of the midvein or leaf and containing radiating larval cells, length 8 to 15 mm, diameter 5 to 6 mm, differs from both Andricus petiolicola and Callirhytis tumifica. Mex. Trotter '11, p. 131

Cynipid. ? Cynips sp.

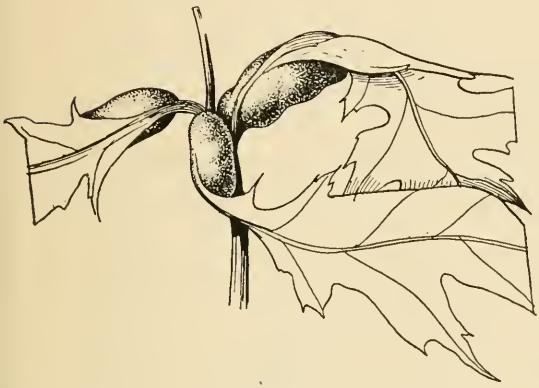

Fig. 75. Midrib tumor gall, Callirhytis tumifica O. S. (Original)

Fig. 76. Midrib tumor gall, Callirhytis tumifica O. S. Section showing arrangement of larval cells. (Original)

Soft, thin-shelled, red or brown vein galls frequently closely pressed together and somewhat resembling figs, on Q. alba, Q. prinoides and Q. prunus. Fig. 66, 84, 1, 2. Beutm. '09d, p. 244

Cynipid. Oak fig gall, Biorhiza forticornis Walsh

Small, rounded, polythalamous, midvein gall projecting equally on both surfaces, diameter 2 to 3 mm, on Q. parvifolia. Ashm. '87, p. 138

Cynipid. Callirhytis parvifoliae Ashm.

Globose, polythalamous, midvein gall near the base of the leaf, prominent on both surfaces, diameter 6 mm, cells radiating from a common center and not separable from woody fiber about them, on Quercus species. Bassett '90, p. 74

Cynipid. Callirhytis reticulata Bass.

Irregular, polythalamous, globose, fleshy gall occurring near the base of the leaf and projecting about equally above and below, diameter 4 to 7 mm. Ashm. '97, p. 116

Cynipid. Andricus morrisoni Ashm.

Globose, hard petiole gall projecting equally above and beneath, at first smooth, reddish brown, minutely pubescent, later turning black, within five longitudinal partitions, diameter 6 mm, on Q. obtusiloba. Ashm. '85, p. 299

Cynipid. Five-chambered oak gall, Andricus quinqueseptum Ashm.

Globose, clustered, monothalamous, midrib gall with a more or less distinct nipple apically and a long stem basally, brown when old, probably green when fresh, diameter 4 to 7 mm, stem 1 to 2.5 mm, resembles a huckleberry, on post oak. Beutm. '13, p. 247

Cynipid. Huckleberry oak gall, Cynips vacciniiformis Beutm.

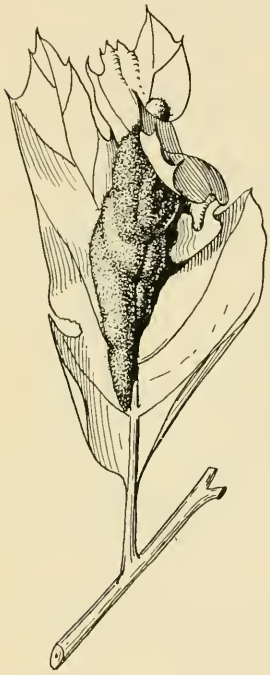

Fig. 77. Woolly fold gall. Cecidomyia niveipila O. S., leaf badly deformed. (Original)

Fig. 78. Woolly fold gall, Cecidomyia niveipila O. S., leaf slightly deformed. (Original)

Globular, clustered, monothalamous, midrib gall, the diameter of individual galls 2 to 5 mm, on Q. undulata, Q. muhlenbergii, Q. prinoides. Stebb. '10, p. 31

Cynipid. Cynips caducus Walsh

Subglobular, straw-colored or brown, midrib galls, flattened next the leaf, within a larval cell with radiating fibers, diameter 4 to 6 mm, on Q. undulata. Fig. 68, 1, 2. Beutm. '11d, p. 348

Cynipid. Dryophanta eburnea Bass.

Rounded or elongate midrib swellings filled with oblong or elongate kernels, a few to 40; when young concealed in the tissues and bursting open in October, on Q. rubra, Q. velutina. Beutm. '13g, p. 131

Cynipid. Deciduous oak gall, Andricus decidua Beutm.

Irregularly rounded, oval or elongate, midrib or vein gall, sometimes deforming the entire leaf, green, turning brown and becoming woody when old, length 10 to 35 mm, diameter 10 to 15 mm, on Q. garryana. Beutm. '13d, p. 280

Cynipid. Neuroterus washingtonensis Beutm.

Fusiform ribbed or carinate mid or lateral vein folds on the under surface, length 6 to 8 mm, diameter 3 to 4 mm. Fig. 73, 74.

Itonid. Cecidomyia sp. a2296

Elongate, polythalamous, midrib swellings with the larval cells perpendicular to the surface of the leaf, length 18 mm, diameter 9 mm, on Q. ? undulata. Beutm. '10, p. 134

Cynipid. Neuroterus quercicola Dalla Torre

(2) Less abrupt and localized enlargements of midveins (more rarely of lateral veins and the petiole)

Midrib, polythalamous swellings mostly near the base of the leaf, some on the petiole, on Q. tinctoria. Fig. 75, 76. Osten Sacken '65, p. 356

Cynipid. Midrib tumor gall, Callirhytis tumifica O. S.

Irregular, elongate or globose enlargements of the midrib or terminal twigs, length 1.5 to 2.5 mm, diameter 4 to 12 mm, on Q. nigra, Q. rubra, Q. lobata. Fullaway '11, p. 362

Cynipid. Callirhytis nigrae O. S.

Irregular, polythalamous, midrib swellings often 2.5 cm long, 1.2 cm in diameter, on Q. tinctoria. Bassett '81, p. 105

Cynipid. Oak midrib gall, Andricus piger Bass.

Slight, fleshy swelling along the midrib, containing two or more small cells, diameter of latter 1.8 to 2 mm, on Q. laurifolia. Ashm. '87, p. 141

Cynipid. Callirhytis cellae Ashm.

Hard, woody, midvein or lateral vein galls, the leaf much wrinkled and deformed, length 18 mm, diameter 6 mm, on Q. macrocarpa. Beutm. '10c, p. 135

Cynipid. Neuroterus flavipes Gill.

Irregular, pustulelike, polythalamous petiole and midrib gall on Q. minor. Beutm. '10c, p. 133

Cynipid. Neuroterus gillettei Bass.

Subglobose, slightly depressed, monothalamous, smooth and, under the lens, squamose, grayish red vein gall, diameter 5 to 6 mm, height 3 to 3.5 mm. Mex. Trotter '11, p. 126

Cynipid. ? Cynips sp.

Spherical, monothalamous, smooth, with a slight, superficial roughness, reddish vein gall, occurs singly or in clusters and when in the latter, somewhat compressed, diameter 5 to 6 mm. Mex. Trotter '11, p. 123

Cynipid. Cynips sp.

Spherical, monothalamous, woody vein gall, the surface smooth, grayish, with minute, grayish warts, diameter 8 mm. Cal. Trotter '11, p. 118

Cynipid. ? Cynips sp.

Irregular, monothalamous or polythalamous thickenings of the mid or lateral veins occurring on both surfaces, diameter 3 to 4 mm. Mex. Trotter '11, p. 128

Cynipid. ? Cynips sp.

Pyriform or clavate, reddish vein galls, the expanded portion with a lateral ridge and longitudinal striations; within a larval cell, height 6 mm, diameter 4.5 mm. Cal. Trotter '11, p. 117

Cynipid. Andricus pistillaris Trott.

Narrow, dark purplish, fusiform, thin-walled swelling on the under side of the mid or lateral veins may contain two or more larvae, length 8 mm. Pl. 8, fig. 9. Felt '16d, p. 159

Itonid. Purple oak vein gall, Cincticornia podagrae Felt

Large, midrib fold with a conspicuous, white pubescence, the leaf frequently deformed. Fig. 77, 78, 79. Stebb. '10, p. 17

Itonid. Woolly fold gall. Cecidomyia niveipila O. S.

Elongate, pocketlike swellings along the midrib of round-leaved scrub oak, length 5 mm. Pl. 8, fig. 3. Felt '08e, p. 411

Itonid. Vein-pocket gall, Parallelodiplosis florida Felt

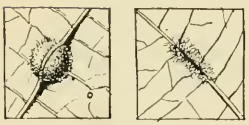

Fig. 79. Woolly fold gall, Cecidomyia niveipila O. S., early stages of two galls. (Original)

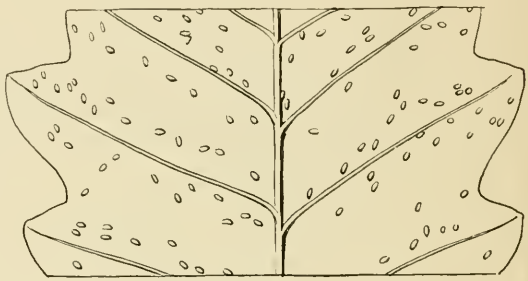

Fig. 80. Oak blister gall, Neuroterus papillosus Beutm. (Original)

Elongate fold gall close to the midrib on the under surface, length 12 mm, diameter 1 mm, on Quercus, possibly identical with the preceding.

Itonid. Cecidomyia oruca Walsh

Fusiform, thin-walled, striate, pale green vein swelling, length 5 mm, diameter 3 mm, on red oak. Pl. 8, fig. 4.

Itonid. Cecidomyia sp. a2728

Globose or blisterlike, monothalamous leaf vein swellings more distinct on the upper side and with a minute nipple on the lower surface, diameter 1 to 1.75 mm, on Q. alba and Q. macrocarpa. Fig. 81, 1. Beutm. '10c, p. 121

Cynipid. Neurotus niger Gill.

Hemispherical or subhemispherical, pale brown, minutely crackled vein gall, diameter 4 mm, height 2.5 mm, on Quercus sp. Fig. 107, 10. Beutm. '10c, p. 125

Cynipid. Neuroterus cockerelli Beutm.

Oval, thin-walled, monothalamous vein swellings covered with a dense, brown pubescence, on Q. alba. Fig. 53, 10. Beutm. '10c, p. 128

Cynipid. Neuroterus pallipes Bass.

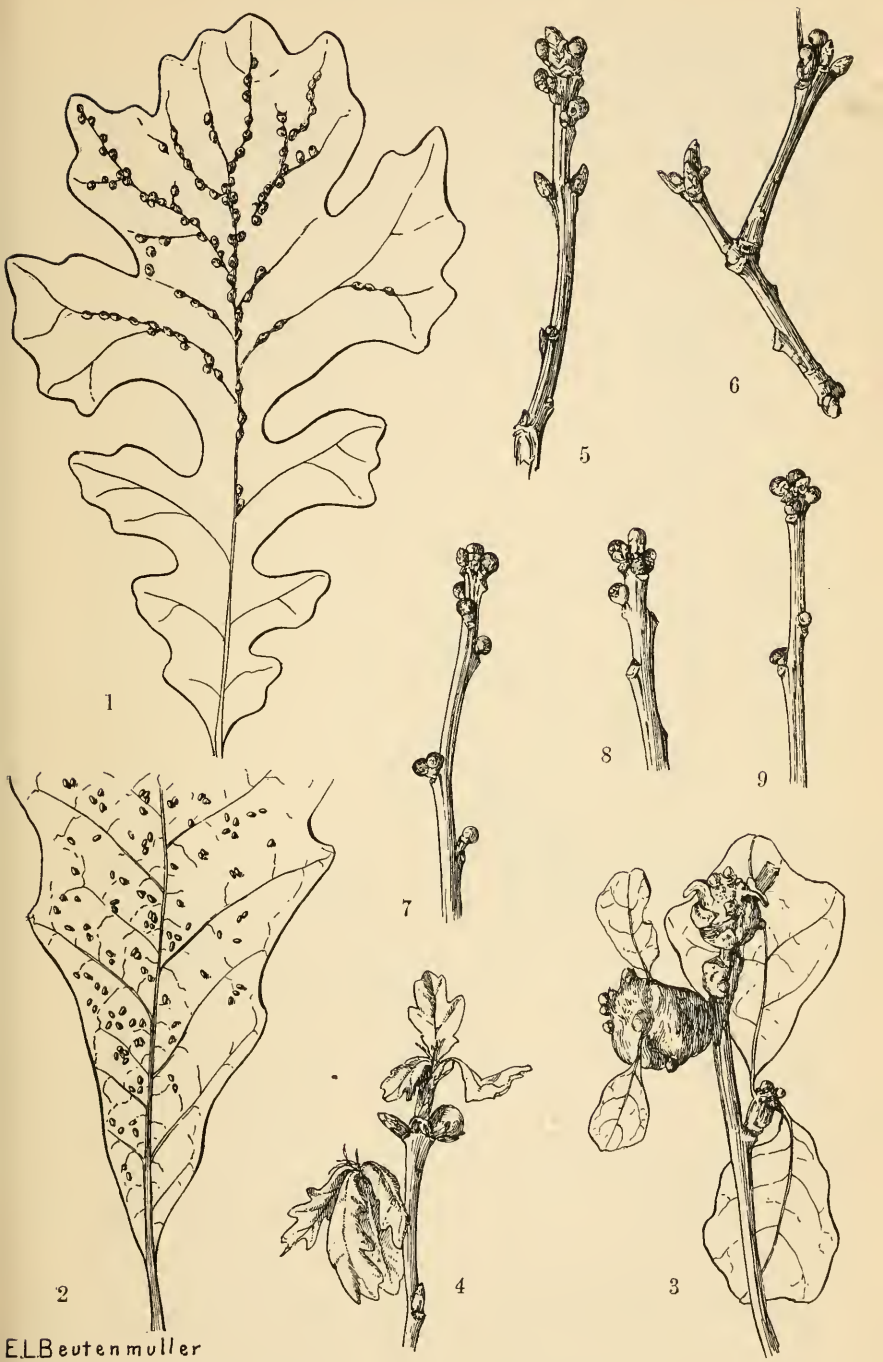

Fig. 81. Neuroterus galls. 1. N. niger Gill. 2. Gall of oak blister wasp, N. papillosus Beutm. 3. Gall of N. consimilis Bass. 4–9. Soft oak bud gall, N. vesiculus Bass. (After Beutm., Am. Mus. Nat. Hist.)

A slight circular, blisterlike swelling on the lateral veins, length 3 mm, diameter 1 mm, on Q. rubra. Felt '16d, p. 161

Itonid. Oak vein blister, Cincticornia americana Felt

Subglobose or fusiform, pale green, yellow margined leaf fold, mostly on under surface, length 3 to 7 mm, diameter 3 mm. Pl. 9, fig. 1.

Itonid. Cecidomyia sp. a1979

Gall, similar to, if not identical with the above. Pl. 9, fig. 2. Stebb. '10, p. 17

Itonid. Cincticornia majalis O. S.

(3) A whole leaf is swollen to form a fleshy, elongated gall

Very irregular, swollen mass originating from the midvein or the petiole of the leaf and involving the whole structure, green and succulent, later shriveling and drying, size variable, on Q. platanoides. Fig. 55. Beutm. '10c. p. 119

Cynipid. Noxious oak gall, Neuroterus noxiosus Bass.

Fig. 82. Eriophyes sp., showing upper and lower surface of leaf. (Original)

Fig. 83. Oak wart gall, Andricus futilis Bass. in profile and sectioned. (Original)

Subglobose, polythalamous, reddish brown leaf gall, entirely deforming small leaves, diameter 4 to 5 mm. Cal. Trotter '11, p. 114

Cynipid. ? Cynips sp.

c Galls involving or attached to the lamina of the leaves

(1) Little or no thickening of the leaf tissues. *See also* (2-3), (4-5), (6), (7-8), (9-10), (11), (12), (13), (14), (15-16), (17), (18), on pages 88, 90, 92, 94, 95, 102, 104, 106, 109, 110, 115 116 respectively.

(*a*) Small, blisterlike or pustular swellings of the leaf blade

Globose, thin-walled, monothalamous leaf galls, single or clustered, showing on both surfaces, diameter 5 mm, on live oak. Fig. 107, 6. Beutm. '10c, p. 122

Cynipid. Neuroterus howertoni Bass

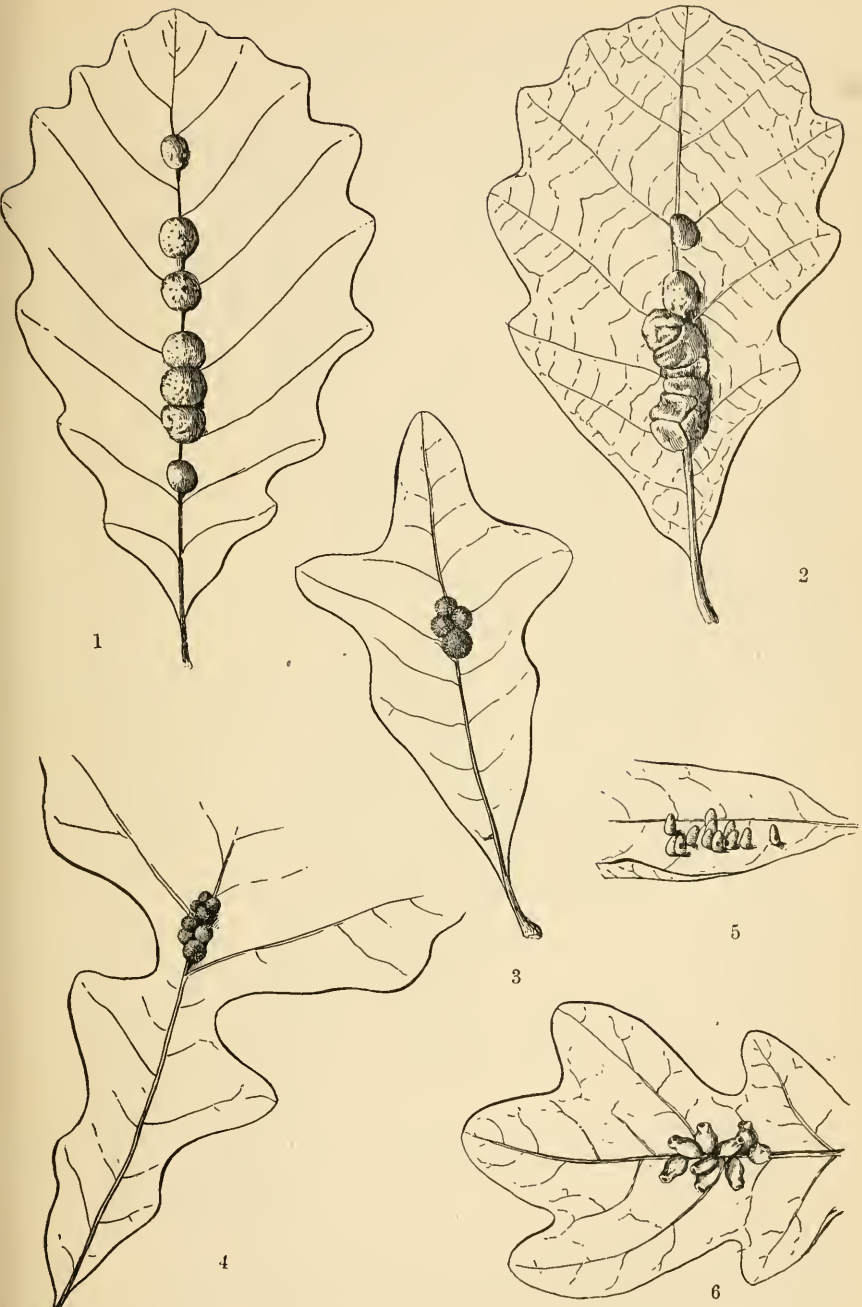

Fig. 84. 1, 2. Oak fig gall, Biorhiza forticornis Walsh on dwarf chestnut oak. 3, 4. B. mellea Ashm. 5. Xystoteras volutellae Ashm. 6. Bell-shaped oak gall, Zopheroteras vaccinii Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Elongate, oval, blisterlike leaf swelling without a nipple, on the under side, length 1 mm, diameter .75 mm, on Q. platanoides. Fig. 80, 81, 2. Beutm. '10c, p. 121

Cynipid. Oak blister wasp, Neuroterus papillosus Beutm.

Subelliptical, blister leaf gall, length 2 to 2.5 mm. Cal. Trotter '11, p. 108

Cynipid. Neuroterus sp.

A broadly yellow-margined, circular, blister leaf gall, diameter 3 mm, on Q. coccinea. Felt '16d, p. 154

Itonid. Oak yellow-spot, Cincticornia serrata Felt

A variable brown, irregularly oval, pustulate leaf swelling, diameter 5 to 6 mm, on Q. velutina, Q. rubra. Pl. 8, fig. 7. Felt '16d, p. 156

Itonid. Oak blister midge, Cincticornia pustulata Felt

An irregularly oval, pustulate swelling showing equally on both leaf surfaces but with no nipple, diameter 5 to 6 mm, on Q. rubra, Q. velutina. See plate 8, figure 8 for similar galls. Felt '16d, p. 157

Itonid. Cincticornia simpla Felt

Irregularly oval, pustulate leaf swelling showing equally on both surfaces but with no nipple, diameter 5 to 6 mm, on Q. velutina. Felt '16d, p. 168

Itonid. Cincticornia sobrina Felt

A slight, circular, blisterlike swelling of the lateral veins, length 3 mm, diameter 1 mm. Felt '08e, p. 380, 381

Itonid. Oak vein blister, Cincticornia americana Felt

A flat, relatively inconspicuous, presumably blister gall on Q. rubra. Felt '16d, p. 155

Itonid. Cincticornia quercifolia Felt

Blister leaf gall, inconspicuous, greenish, diameter 4 to 5 mm, on Q. agrifolia

Itonid. Cecidomyia sp. a2905

(*b*) Superabundant leaf hairs (erineum) or more or less distinct dimples

A yellowish green dimple, convex on the upper surface of the leaf, lined within with whitish or brownish hairs, on Q. alba. Chad, '08, p. 142

Acarid. Eriophyes sp.

Very small, pocket galls, crowded on the upper surface of the leaf, on Q. platanoides. Chad. '08, p. 143

Acarid. Eriophyes sp.

Galls on the leaves of burr oak, Q. macrocarpa. Parrott et al. '06, p. 289

Acarid. Eriophyes querci Garm.

Deformation of leaves on the margin, on Q. minor. Chad. '08, p. 142

Acarid. Eriophyes sp.

A large, greenish yellow dimple, slightly convex above, beneath filled with a dense, brown pubescence, on Q. macrocarpa. Chad. '08, p. 142

Acarid. Eriophyes sp.

Greenish or reddish elevations on the upper surface, the concavity below nearly filled with yellowish brown hairs, on Q. marilandica. Fig. 82.

Acarid. Eriophyes sp.

Brown erineum on the under side of the leaves, on Q. rubra. Chad. '08. p. 143

Acarid. Eriophyes sp.

Large patches of dense, brown hairs on the under side of the leaf, on Q. coccinea. Chad. '08, p. 142

Acarid. Eriophyes sp.

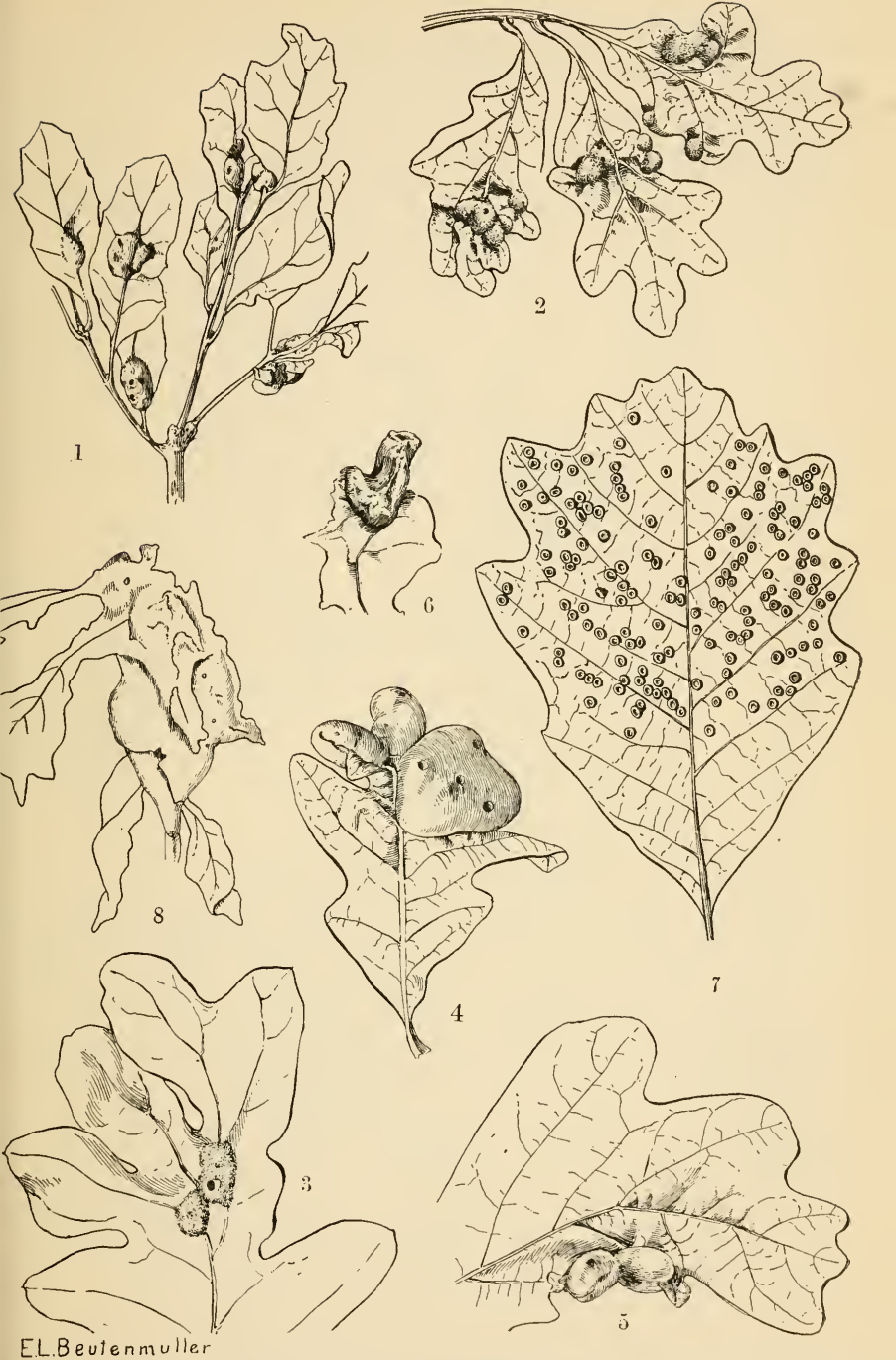

Fig. 85. Neuroterus galls. 1. Gall of N. fragilis Bass. 2, 3. Gall N. irregularis O. S. 4–6. Gall of N. majalis Bass. 7. Oak button gall, N. umbilicatus Bass. 8. Gall of N. obtusilobae Karsch. (After Beutm., Am. Mus. Nat. Hist.)

Velvety red erineum on the under side of the leaf, the younger portions greenish, on Q. velutina. Chad. '08, p. 143

Acarid. Eriophyes sp.

A snuff-brown erineum in large patches on the under side of the leaf of Q. nana. Chad. '08, p. 142

Acarid. Eriophyes sp.

An ashen erineum in the angles of the veins and spreading along them, mostly on the under side of the leaves, on Q. palustris, Q. texana, Q. velutina. Chad. '08, p. 152

Acarid. Eriophyes sp.

Larvae on a grayish green erineum, on Q. utahensis

Itonid. Cecidomyia sp.

Fig. 86. Succulent oak gall, Dryophanta palustris O. S. One gall in section showing loose cell. (Original)

(2) Blister above lamina, woolly gall beneath

Globose leaf gall, smooth above, thickly covered with white wool below, single or confluent, diameter 1.5 to 3.5 mm, on Q. alba and Q. platanoides. Beutm. '10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

(3) Rounded gall with several cells imbedded in the lamina of the leaf

Small, slightly flattened, green leaf gall projecting from both surfaces, hollow, containing two or three oblong, filament-suspended cells, diameter about 3 mm, on Q. alba. Fig. 83, pl. 2, fig. 3. Osten Sacken '61, p. 63

Cynipid. Oak wart gall, Andricus futilis Bass.

Round, flattened leaf gall projecting on both surfaces, red above, yellowish below, diameter about 3 mm, on Q. coccinea, Q. prinus. Pl. 2, fig. 6. Osten Sacken '61, p. 64

Cynipid. Oak nipple gall, Andricus papillatus O. S.

Small, irregular, hard swellings on both sides of the leaf and concolorous, diameter 4 mm, on Q. rubra. Osten Sacken '61, p. 66

Cynipid. Callirhytis modestus O. S.

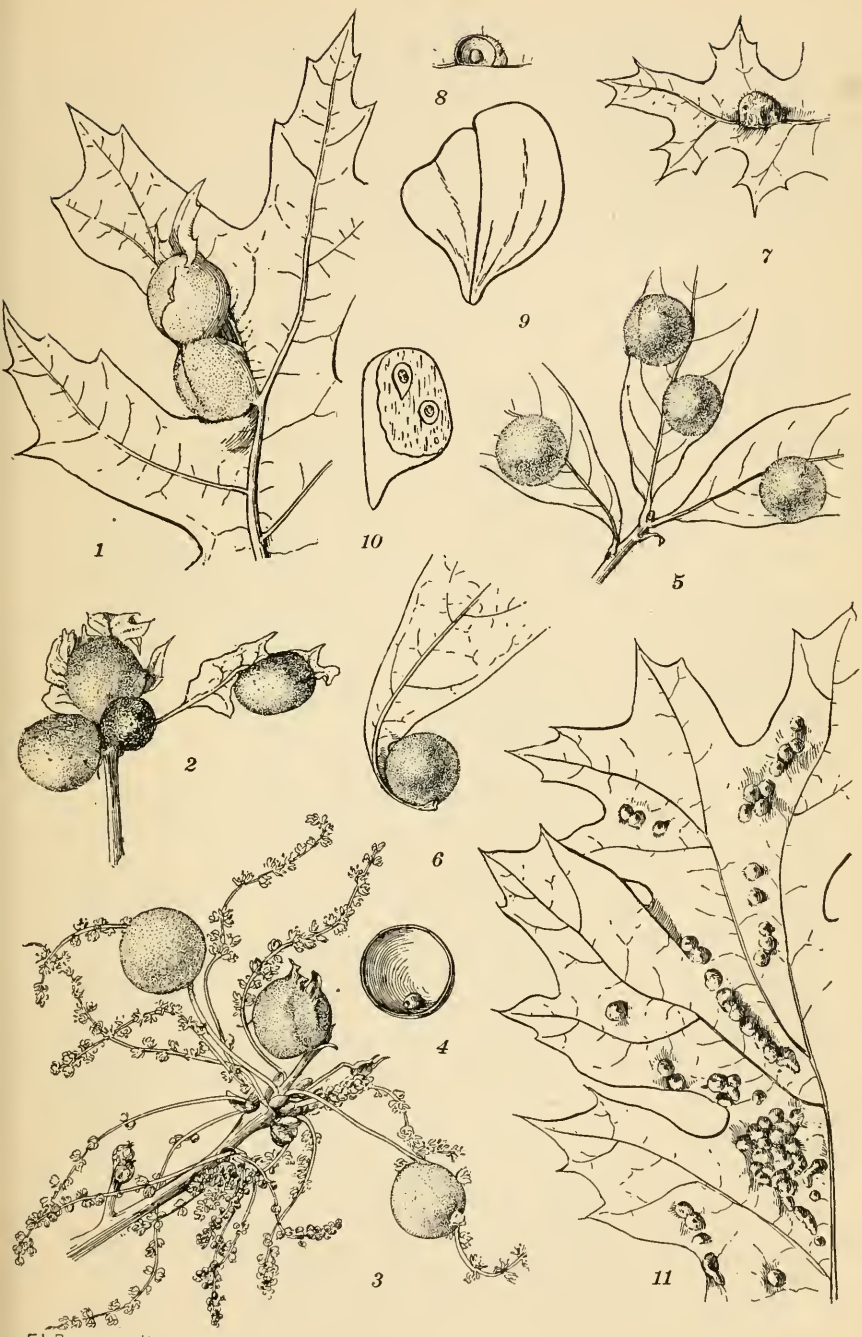

Fig. 87. Dryophanta galls. 1–4. Succulent oak gall, D. palustris O. S. 5. D. laurifoliae Ashm. 6. D. aquaticae Ashm. 7, 8. Callirhytis saccularius Bass. 9, 10. Dryophanta radicola Ashm. 11. D. papula Bass. (After Beutm., Am. Mus. Nat. Hist.)

(4) Galls making a sort of thickened and elevated area in the lamina

(*a*) The platform is formed of crowded, monothalamous galls

Papillose or conelike, clustered, small leaf galls projecting unequally and usually crowded, on Q. rubra, Q. tinctoria and Q. coccinea. Fig. 87, 11. Beutm. '11d, p. 360

Cynipid. Dryophanta papula Bass.

Globular, single or clustered leaf gall covered with minute, warty pubescent dots, monothalamous, fleshy, on the upper surface, diameter 2.5 to 3.75 mm, on Q. minor. Fig. 84, 3, 4. Beutm. '09d, p. 245

Cynipid. Biorhiza mellea Ashm.

(*b*) The platform is made by a single polythalamous gall

Flattened, polythalamous leaf galls projecting from both surfaces of the leaf diameter 6 to 24 mm, the upper and lower surfaces resembling a honey comb, on Q. tinctoria. Bassett '90, p. 87

Cynipid. Honeycomb leaf gall, Neuroterus favosus Bass.

Irregular, somewhat flattened, polythalamous, yellowish, pithy leaf galls, on Q. minor and Q. alba. Fig. 85, 2, 3. Beutm. '10c, p. 134

Cynipid. Neuroterus irregularis O. S.

Flattened, often very irregular, green, succulent leaf galls, horizontal diameter 6 to 25 mm, vertical diameter 6 to 9 mm, on Q. alba. Bassett '64, p. 682

Cynipid. Dolichostrophus majalis Bass.

Pale yellowish green, irregular, polythalamous leaf galls, usually in the midrib, on Quercus species. Fig. 85, 1. Beutm. '10c, p. 133

Cynipid. Neuroterus fragilis Bass.

Globose or subglobose, irregular, reddish, wrinkled leaf gall, diameter 3 to 4 mm, on red oak. Pl. 9, fig. 3. Felt '16d, p. 164

Itonid. Oak pill gall, Cincticornia pilulae Walsh

Gall similar to that of Cincticornia pilulae and possibly identical, apparently southern. Osten Sacken '62, p. 200. Felt '16d, p. 167

Itonid. Cincticornia symmetrica O. S.

Gall similar to, though much smaller than that of Cincticornia pilulae. Felt '15e, p. 157

Itonid. Dasyneura florida Felt

(5) Gall spherical, semispherical or conical; usually succulent and consisting of a wall inclosing a chamber in which the larval cell lies free. Some of these galls are loosely attached to the leaf, though more often they are imbedded in the blade.

(*a*) Gall globular

Globose, succulent, hollow leaf, bud and catkin gall containing a white, free, globular kernel, green, sometimes red-tinged, diameter 5 to 12 mm, on various oaks. Fig. 86, 87, 1–4. Beutm. '11d, p. 361

Cynipid. Succulent oak gall, Dryophanta palustris O. S.

Globose, hollow, plum-colored leaf gall, similar to that of D. palustris and developing equally upon both leaf surfaces; within a small, free cell, on Q. aquatica. Fig. 87, 6. Beutm. '11d, p. 363

Cynipid. Dryophanta aquaticae Ashm.

Gall similar to that of D. palustris, except that it projects about equally on both surfaces of the leaf, length 5 to 6.25 mm, diameter 3 to .75 mm, on Q. laurifolia. Fig. 87, 5. Beutm. '11d, p. 362

Cynipid. Dryophanta laurifoliae Ashm.

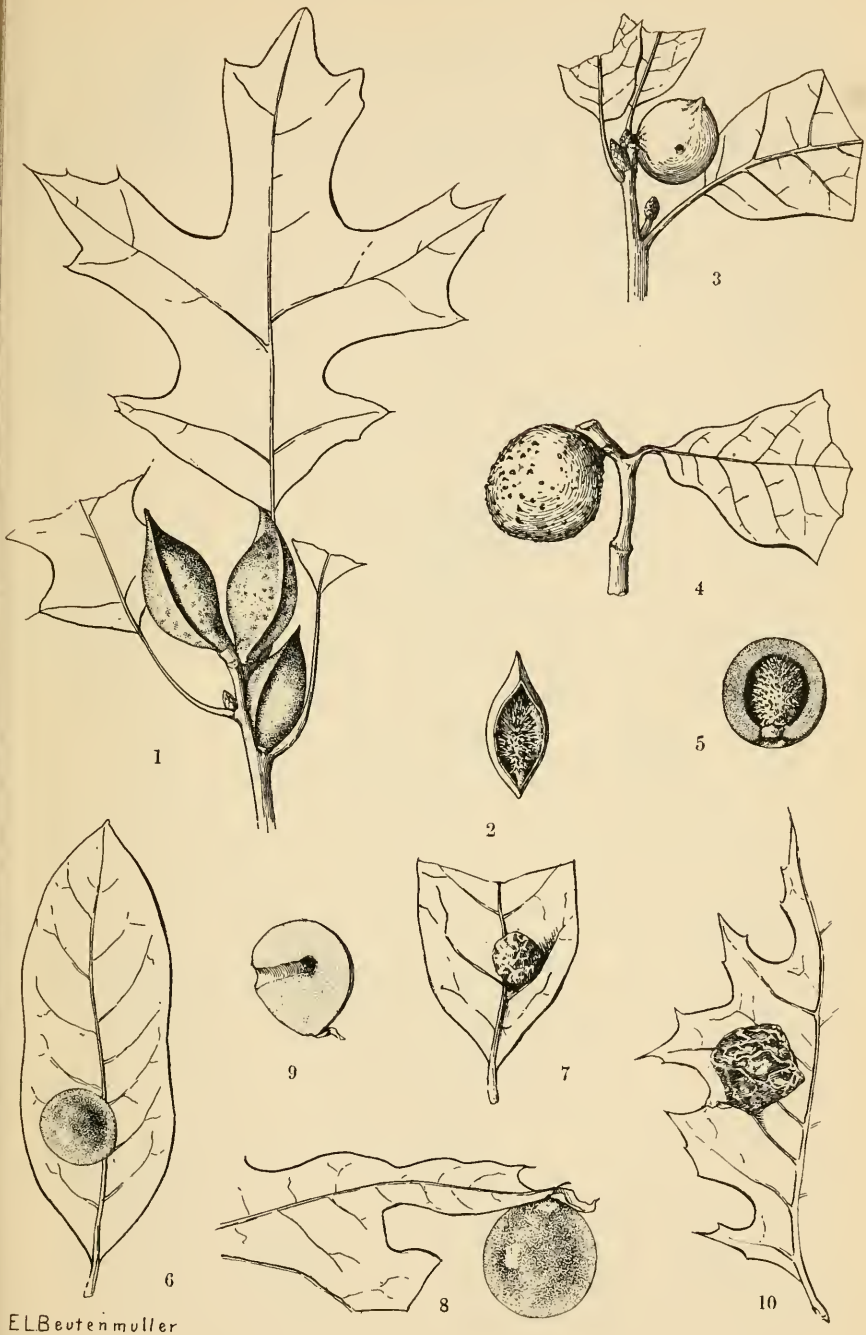

Fig. 88. Oak apples. 1, 2. Keeled oak apple, Amphibolips tinctoriae Ashm. 3–5. A. globulus Beutm. 6, 7. A racemaria Ashm. 8–10. Translucent oak gall, A. nubilipennis Harr. (After Beutm., Am. Mus. Nat. Hist.)

Globose, succulent leaf gall with a loose, whitish kernel similar to that of Dryophanta aquaticae but much smaller, on Q. catesbaei. Beutm. '11d, p. 365

Cynipid. Dryophanta quercifoliae Ashm.

Globose, somewhat roughened, fuzzy, thick-celled leaf galls closely resembling those of D. palustris, diameter 6.5 mm to 9.5 mm, on red oak and scarlet oak. Beutm. '11d, p. 364

Cynipid. Dryophanta liberaecellulae Gill.

Globose, succulent, yellowish green, hollow galls containing a free cell and attached to the vein on the under side of the leaf of Q. laurifolia, diameter 1.5 mm, height 2.5 mm. Beutm. '11d, p. 365

Cynipid. Dryophanta confusa Ashm.

(*b*) Hemispherical or conical, attached to the under surface of the leaf

Subglobose, greenish gray, somewhat longitudinally ribbed, rugose, sessile galls; internally, with a loose kernel, diameter 4 mm, height 3.25 mm, on Q. cinerea. Fig. 99, 11, 12. Beutm. '11d, p. 367

Cynipid. Dryophanta cinereae Ashm.

Hemispherical, pouchlike, green leaf galls on the under surface, diameter 5 mm, walls thin, within a free, oval larval cell, on Q. coccinea. Fig. 87, 7, 8. Bassett '90, p. 76

Cynipid. Callirhytis sacculariusBass.

Single or clustered, conical, bluish gray, monothalamous leaf galls, height 3 to 3.5 mm, diameter 2.5 mm, on Q. macrocarpa. Fig. 84, 5. Beutm. '09d, p. 256

Cynipid. Xystoteras volutellae Ashm.

(6) Succulent, solid, spherical galls, usually firmly attached to the leaf blade

Globular or ovate, green, sometimes tinged with pink, succulent, translucent leaf gall, diameter 6 to 18 mm, on Q. rubra and Q. coccinea. Fig. 88, 8–10. Beutm. '09b, p. 60

Cynipid. Translucent oak gall, Amphibolips nubilipennis Harr.

Globose, rosy, juicy leaf galls on the upper surface, diameter 2 to 3 mm, on Q. alba. Beutm. '09d, p. 245

Cynipid. Biorhiza rubina Gill.

Globose, crisp, sour and succulent, green, becoming brown, leaf gall, internally with a reddish larval cell, diameter 8 to 10 mm, on Q. laurifolia in April and May. Fig. 88, 6, 7. Beutm. '09b, p. 61

Cynipid. Amphibolips racemaria Ashm.

Subglobular, thin-shelled leaf gall about the size of a pea, pointed at opposite poles, on Q. douglasii. Fullaway '11, p. 353

Cynipid. Andricus brunneus Fullw.

Subhemispherical, brown, slightly nippled, monothalamous gall on the under side of the leaf, diameter 1.75 mm, on black oak, probably Q. velutina. Pl. 13, fig. 8. Felt '16d, p. 160

Itonid. Cincticornia globosa Felt

Globose gall, diameter 4 mm, on under side of running oak leaf. Felt '11k, p. 551

Itonid. Youngomyia quercina Felt

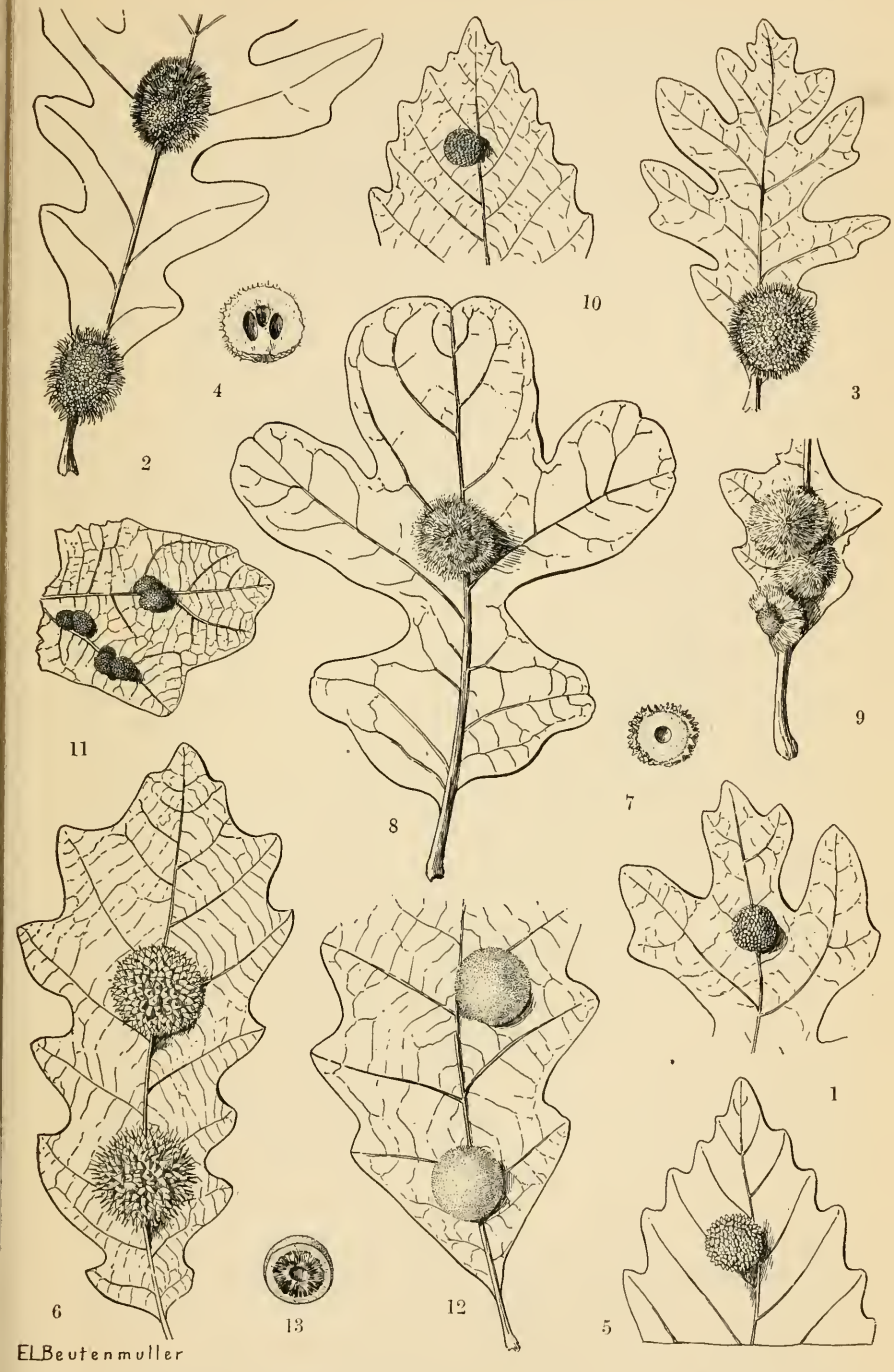

Fig. 89. Philonix galls. 1. Oak pea gall, P. pezomachoides O. S. 2–4. Oak hedgehog gall, P. erinacei Beutm. 5. Yellow sea urchin, P. echini Ashm. 6, 7. Spiny oak gall, P. prinoides Beutm. 8, 9. Hairy oak gall, P. villosa Gill. 10. P. hirta Bass. 11. Jewel oak gall, P. macrocarpae Bass. 12, 13. P. niger Gill. (After Beutm., Am. Mus. Nat. Hist.)

(7) Small, solid, fleshy galls loosely attached to the leaf

Subglobular, greenish yellow, smooth, hard leaf galls attached to the under surface, internally hard, fibrous, diameter 5 mm, vertical diameter 2 to 2.5 mm, on Q. laurifolia. Ashm. '81, p. XVIII

Cynipid. Andricus rugosus Ashm.

Globular, single or clustered leaf galls covered with minute, warty, pubescent dots, monothalamous, fleshy, on the upper surface, diameter 2.5 to 3.75 mm, on Q. minor. Fig. 84, 3, 4. Beutm. '09d, p. 245

Cynipid. Biorhiza mellea Ashm.

Globose, white or red tinged, waxlike, juicy, monothalamous gall on the under surface of leaves of Q. rubra and Q. coccinea. Beutm. '09d, p. 253

Cynipid. Philonix compressa Gill

(8) Moderate sized, hard galls loosely attached to the vein below and with a faceted or spiny surface

(*a*) Surface faceted

Globular, pale yellowish leaf galls finely netted with fissures or cracks and intervening elevated points; occurs on both surfaces and contains two larval cells, diameter 5 to 7 mm. Fig. 89, 1. Beutm. '09d, p. 247

Cynipid. Oak pea gall, Philonix pezomachoides O. S.

Oval or rounded, monothalamous, pale green or yellow leaf vein gall, the surface fissured, each facet with a short, hard point, diameter 2 to 4 mm, on Q. macrocarpa and Q. undulata. Fig. 89, 11. Beutm. '09d, p. 251

Cynipid. Jewel oak gall, Philonix macrocarpae Bass.

Globular, monothalamous, fissured, green gall, each facet with a short point, diameter 4 to 6 mm, on Q. prinus. Fig. 89, 10. Beutm. '09d, p. 350

Cynipid. Philonix hirta Bass.

(*b*) Facets on the surface pointed or spine-tipped

Globose leaf gall with the surface finely netted or fissured like a strawberry and covered with short, spiny prickles, yellowish, and containing one to four cells, diameter 5 to 7 mm, on Q. platanoides. Fig. 89, 5. Beutm. '09d, p. 248

Cynipid. Yellow sea urchin, Philonix echini Ashm.

Globular, woody, monothalamous midrib leaf gall with numerous conelike projections, green or yellowish, usually red tinged, diameter 6 to 12 mm, on Q. prinoides. Fig. 89, 6, 7. Beutm. '09d, p. 249

Cynipid. Spiny oak gall, Philonix prinoides Beutm

(*c*) Spines of the facets long

Globose or elongate, polythalamous leaf gall netted with fissures or cracks, more or less densely covered with spines and yellow, sometimes shaded with red, length 10 to 20 mm, diameter 6 to 12 mm, on Q. alba. Fig. 89, 2–4. Beutm. '09d, p. 247.

Cynipid. Oak hedgehog gall, Philonix erinacei Walsh[1]

(*d*) Spines long, hairlike

Globular, fissured midrib leaf gall somewhat like that of P. erinacei but densely covered with long, bristlelike hairs, pale yellow, monothalamous, bristlelike hairs 3 mm long, diameter 9 to 11 mm, on Q. macrocarpa. Fig. 89, 8, 9. Beutm. '09d, p. 249

Cynipid. Hairy oak gall, Philonix villosa Gill

[1] Agamic form of Cynips erinacei, see Triggerson, Ent. Soc. Am. Ann. 7:26, 1914.

Subglobose, monothalamous, yellowish white, hairy vein gall, diameter 4 to 10 mm. Wash. Trotter '11, p. 106

Cynipid. Philonix sp.

(9) Solid galls attached to the leaf and with a central, harder kernel or larval cell. These approach the oak apple gall in structure

Globular, grayish, pubescent, monothalamous, thin-shelled leaf gall, pithy internally, diameter 7.5 to 8 mm, on the under surface, on Q. platanoides. Beutm. '09d, p. 252

Cynipid. Philonix lanaeglobuli Ashm.

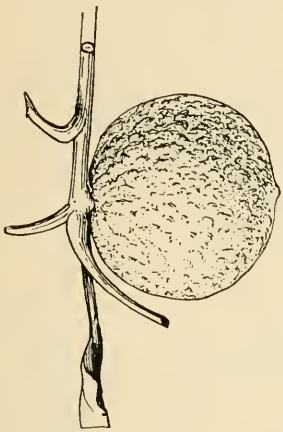

Fig. 90. Large oak apple, Amphibolips confluens Harr. (Original)

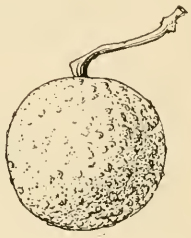

Fig. 91. Larger empty oak apple, Amphibolips inanis O. S. (Original)

Globular, below brownish, the size of a pea or slightly larger, two to ten on the under side of the leaf, within a dense, yellowish brown, spongy mass; diameter 3.75 to 6 mm, on Q. virens. Ashm. '81, p. X

Cynipid. Andricus virens Ashm.

(10) Oak apples, i. e. galls with a central, hard kernel or larval cell, a firm (often hard) outer shell and a spongy or fibrous intervening substance

(*a*) Intervening substance is spongy

[1] Size large

Globular, smooth, shining or opaque leaf gall, internally a juicy, white, spongy substance and a large central larval cell, green, turning with age to light brown, diameter 2.5 to 5 cm, usually on a vein or petiole, on Q. rubra, Q. coccinea and Q. velutina in May and June. Fig. 90, 92, 1–2. Beutm. '09b, p. 50

Cynipid. Large oak apple, Amphibolips confluens Harr.

Spherical oak apple, dirty yellow, with wine-red stripes, diameter 1 to 2 cm, resembles A. confluens. Mex. Trotter '11, p. 129

Cynipid. ?Amphibolips sp.

Globose, yellowish brown twig gall with an uneven, wrinkled surface, internally spongy, the larval cell rounded, diameter 3.5 to 7 cm, on Quercus sp. Fig. 111, 10, 11. Beutm. '09b, p. 64

Cynipid. Palmer's oak apple, Amphibolips palmeri Bass.

Fusiform, tapering, the apex usually somewhat curved, yellowish brown twig gall, internally spongy, with a hard larval cell, length 3 to 5.5 cm, diameter 1.5 to 3 cm, on Q. marilandica in May and June. Fig. 92, 4, 5. Beutm. '09b, p. 53

Cynipid. Fusiform oak apple, Amphibolips acuminata Ashm.

Globose, monothalamous, very thin-shelled leaf and twig gall, internally soft, light, spongy, not unlike A. confluens, form spongifica, diameters 3.5 and 3 cm. Beutm. '09b, p. 53

Cynipid. Amphibolips longicornis Bass.

Globular leaf gall resembling that of A. confluens, form spongifica, and A. cinerea, but the surface is more coarsely reticulated and less glossy and the larval cell much darker in color, diameter 2.5 cm, on midrib near base of leaf, on Q. ?minor. Fig. 92, 3. Beutm. '09b, p. 52

Cynipid. Amphibolips carolinensis Bass.

Lemon-shaped, monothalamous, green, yellowish and finally brown oak apple, length 10 to 15 mm, diameter 7 to 10 mm, the central cell with a length 4 to 4.5 mm, diameter 1.5 to 2 mm. Cal. Trotter '11, p. 114

Cynipid. Cynips sp.

Ellipsoidal, woody, greenish oak apple, the base rounded, apically a short, obtuse point, length 17 mm, diameter 10 mm. Cal. Trotter '11, p. 110

Cynipid. Amphibolips sp.

Globular, grayish brown or black, pubescent, monothalamous, thin-shelled leaf gall, the larval cell supported by a loosely fibrous mass, diameter 6 to 11 mm, on under surface of leaf of Q. alba, Q. macrocarpa and Q. prinoides. Fig. 89, 12, 13. Beutm. '09d, p. 251

Cynipid. Philonix niger Gill.

[2] Size small

Globose, monothalamous, light reddish leaf gall filled with spongy tissue, except for the large cell, diameter 6 mm, on Q. rydbergiana. Beutm. '11d, p. 355

Cynipid. Dryophanta rydbergiana Ckll.

Globose, spined, brown, thick-shelled leaf gall, internally slightly spongy, diameter 7.5 mm, on Q. laurifolia. Beutm. '09b, p. 59

Cynipid. Spiny oak apple, Amphibolips spinosa Ashm.

Subspherical or subpyriform, monothalamous oak apple, diameter 4 to 5 cm. Mex. Trotter '11, p. 131

Cynipid. ?Cynips sp.

(*b*) The substance lying between the rind and the kernel is fibrous and often very scanty

[1] Size large, kernel central, leaf usually aborted

Globose, bright green, becoming yellowish brown, slightly nippled, thin-shelled, glossy leaf gall, the central larval cell supported by radiating fibers, diameter 25 to 35 mm, on Q. coccinea, Q. rubra in May and June. Fig. 91, 92, 6, 7. Beutm. '09b, p. 54

Cynipid. Larger empty oak apple, Amphibolips inanis O. S.

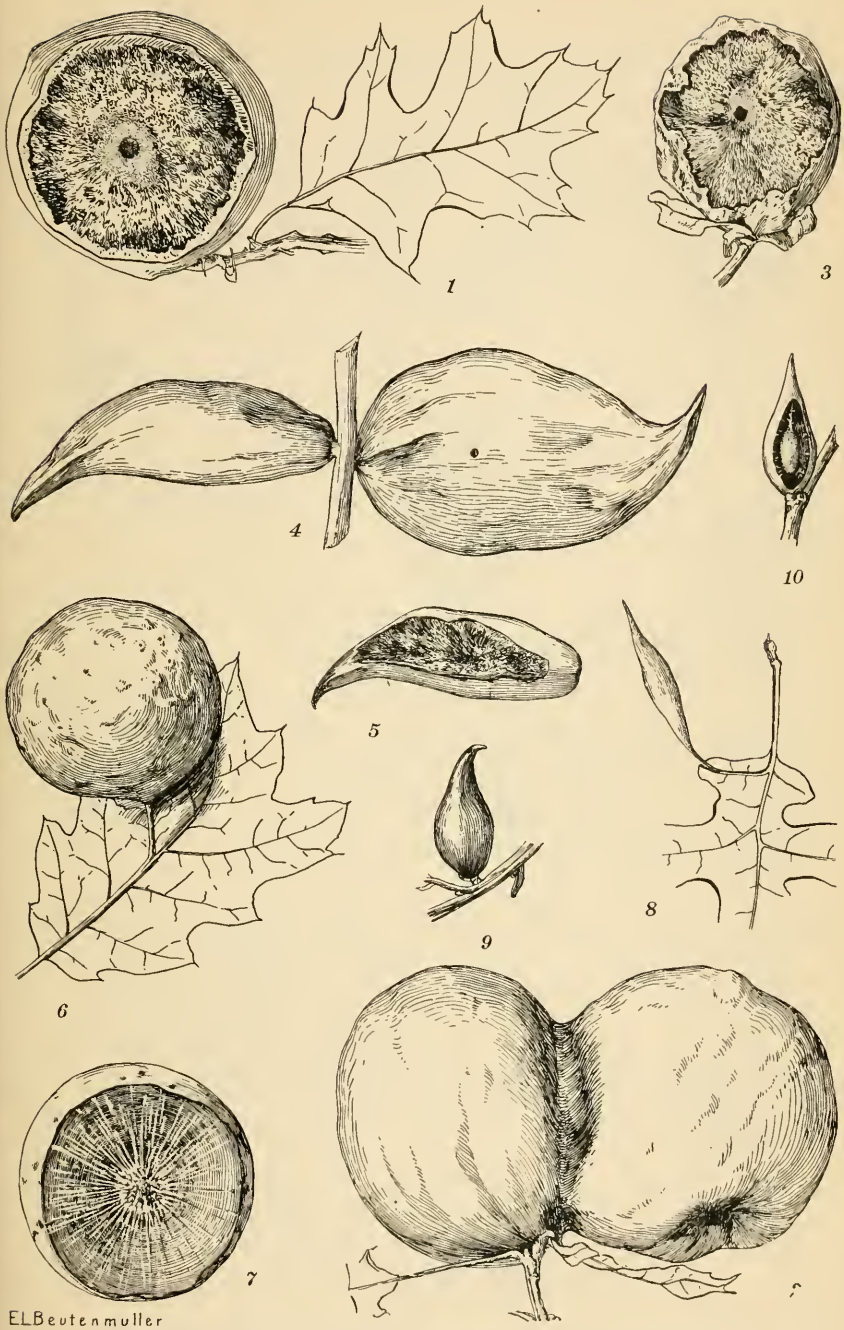

Fig. 92. Oak apples. 1, 2. Large oak apple, Amphibolips confluens Harr. 3. A. carolinensis Bass. 4, 5. Fusiform oak apple, A. acuminata Ashm. 6, 7. Larger empty oak apple, A. inanis O. S. 8–10. Oak spindle gall, A. coelebs O. S. (After Beutm., Am. Mus. Nat. Hist)

Globose, white, yellowish or brownish, velvety, thin-walled leaf gall, diameter 30 to 40 mm, within a thick-walled, fiber-supported cell with a diameter of 10 mm. Galls usually in groups of two or three, on the under side and near the base of the leaf. Kieff. '11, p. 346

Cynipid. Disholcaspis lapiei Kieff.

Globose, thin-shelled leaf gall with a central, filament-supported kernel, diameter 1.2 to 2.5 cm, resembles gall of A. inanis but averages smaller and the color is darker, on Q. vaccinifolia. Ashm. '97, p. 130

Cynipid. Callirhytis vaccinifoliae Ashm.

Globular, thin-shelled leaf gall, sometimes tinged with pink and covered with a white bloom; internally a central, filament-supported cell, diameter 15 to 20 mm, on under side of leaf of Q. minor. Fig. 63, 1. Beutm. '09a, p. 42

Cynipid. Dryophanta centricola O. S.

Globose or ovate, slightly nippled, dark crimson with lighter mottlings and becoming brown, thick-shelled twig gall with filament-supported larval cell, length 2.5 to 3.5 cm, diameter 2 to 3 cm, on Q. brevifolia. Fig. 93, 7–10. Beutm. '09b, p. 57

Cynipid. Amphibolips cinerea Ashm.

Subspherical, green, later yellowish, finally brown oak apple with numerous small points and a fiber-supported larval cell, diameter 3 cm. Cal. Trotter '11, p. 112

Cynipid. ?Callirhytis sp.

Globose, very thin-shelled, yellowish, irregularly reddish brown marked leaf gall containing a fiber-supported larval cell, diameter 2 cm, on Q. rubra. Fig. 99, 4, 5. Beutm. '11d, p. 351

Cynipid. Dryophanta rubrae Karsch

Globose or ovate, yellowish green or brown, glossy when dry, thin-shelled, slightly nippled, axill ay bud gall, diameter 7 to 15 mm, on Q. nigra. Fig. 93, 1–4. Beutm. '09b, p. 57

Cynipid. Amphibolips melanocera Ashm.

Globose, thin-shelled, pubescent, yellowish, pink or red-shaded leaf gall, within a fiber-supported larval cell, diameter 6 to 18 mm, on Q. hypoleuca. Fig. 97, 6, 7. Beutm. '11d, p. 345

Cynipid. Dryophanta dugesi Mayr.

Irregular, subglobose, usually clustered, monothalamous, straw-colored or brown leaf gall containing a fiber-supported cell, occurs on both surfaces of the leaf, on Q. undulata and Q. gambelii. Fig. 68, 1, 2. Beutm. '11d, p. 348

Cynipid. Dryophanta eburnea Bass.

Fusiform to subglobular, pointed, yellowish, thin-shelled twig gall with a fiber-supported cell, length 12 to 24 mm, diameter 6 to 12 mm, on Q. phellos. Fig. 94, 6–10. Beutm. '09b, p. 56

Cynipid. Small pointed oak apple, Amphibolips citriformis Ashm.

Elongate, fusiform, dark green leaf gall, usually arising from the petiole, internally an ovate, fiber-supported cell, length 25 to 55 mm, diameter 7 to 20 mm, on the upper leaf surface of Q. nana. Fig. 93, 5, 6. Beutm. '09b, p. 55

Cynipid. Scrub oak gall, Amphibolips ilicifoliae Bass.

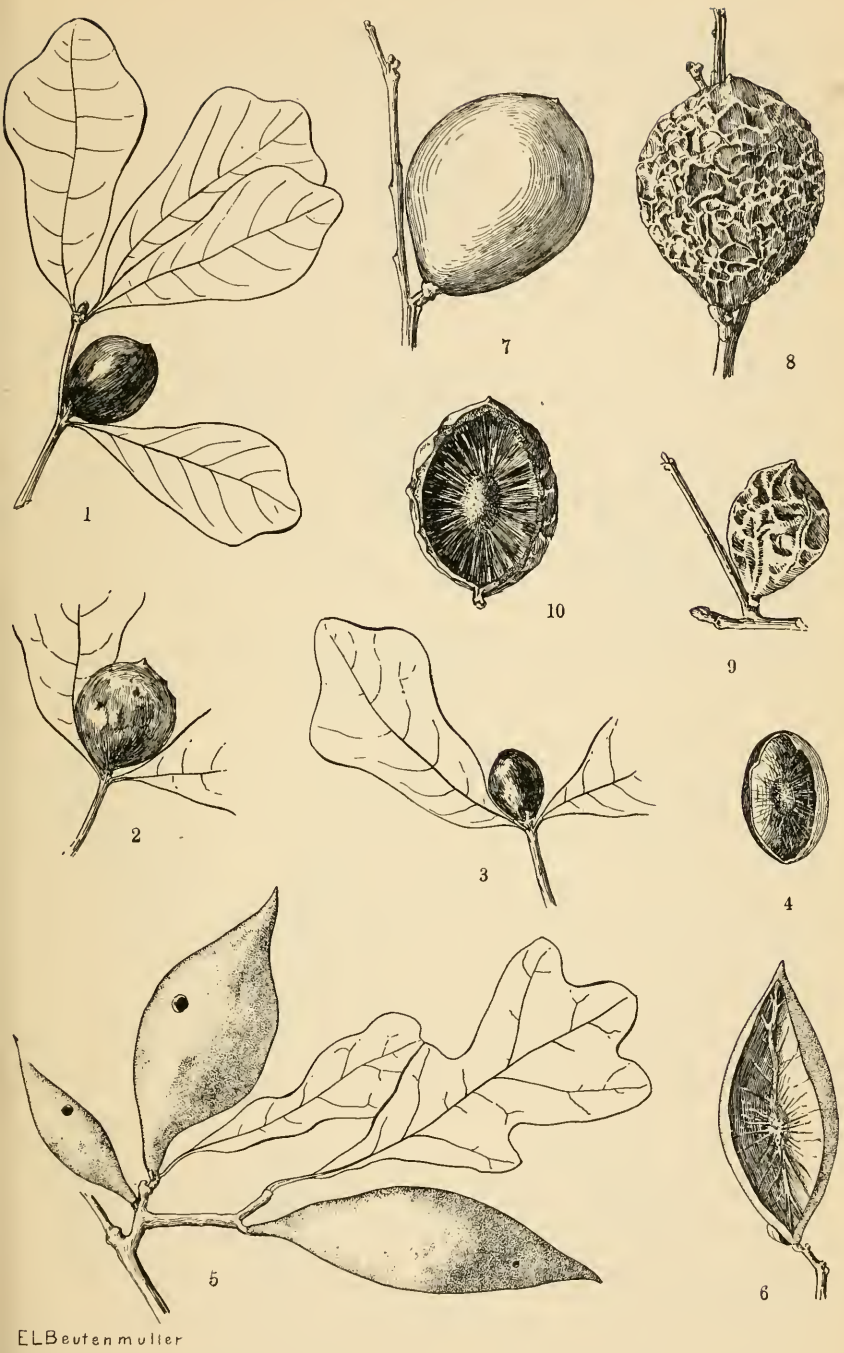

Fig. 93. Oak apples. 1–4. Amphibolips melanocera Ashm. 5, 6. Scrub oak gall, A. ilicifoliae Bass. 7–10. A. cinerea Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globose, single or clustered, yellowish, brown-spotted leaf galls occurring on both surfaces, a fiber-supported larval cell, diameter 15 to 35 mm, on Q. wrightii, Q. undulata and Q. garryana. Fig. 63, 2, 3. Beutm. '09a, p. 43

Cynipid. Cynips maculipennis Gill.

Spherical oak apple, smooth, reddish, with fiber-supported larval cell, diameter 15 to 20 mm. Cal. Trotter '11, p. 105

Cynipid. ?Cynips sp.

Globose, reddish brown oak apple containing a fiber-supported cell, maximum diameter 5 cm. Mex. Trotter '11, p. 128

Cynipid. ?Amphibolips sp.

[2] Size small, leaf aborted

Almond-shaped, pointed, keeled bud or twig gall, green or reddish, becoming brown, smooth, rather thick-shelled with a central, fiber-supported cell, length 12 to 20 mm, on Q. velutina and Q. rubra in autumn. Fig. 88, 1, 2. Beutm. '09b, p. 59

Cynipid. Keeled oak apple, Amphibolips tinctoriae Ashm.

Globose, slightly nippled, green, spotted with red, becoming brown, moderately thick-shelled twig or bud gall, with a fiber-supported, central cell, diameter 16 to 18 mm, on Q. rubra in September and October. Fig. 94, 1–5. Beutm. '09b, p. 58

Cynipid. Amphibolips cookii Gill

Globular, very thin-shelled leaf gall containing a fiber-supported cell, diameter 8 mm, on Q. laurifolia. Ashm. '87, p. 141

Cynipid. Andricus femoratus Ashm.

[3] Gall small, leaf present and gall usually on the under side and solitary

Globose, yellowish, yellowish brown and brown spotted when dry, leaf gall, single or clustered, with fiber-supported cell, diameter 15 to 35 mm, on under surface of leaf of Q. wrightii, Q. undulata and Q. garryana. Beutm. '09a, p. 43

Cynipid. Cynips maculipennis Gill.

Globular, thin-shelled, straw colored, stained with rusty brown and a fiber-supported central cell, diameter 11 to 18 mm, on Q. undulata. Fig. 63, 4, 5. Beutm. '09a, p. 42

Cynipid. Disholcaspis brevipennata Gill.

Globose, monothalamous, thin-shelled leaf gall, often near the margin and mostly on the midrib, with a fiber-supported cell, brown or pinkish brown when dry, with a fine pubescence and nearly smooth though not polished, diameter 12 to 22 mm, on Q. ?arizonica. Fig. 97, 1–3. Beutm. '11d, p. 343

Cynipid. Dryophanta bella Bass.

Subglobose, monothalamous, brown, thin-shelled, solitary or clustered leaf gall, diameter 2 to 3.5 mm, on under surface of leaf of Q. emoryi. Fig. 108, 4–7. Beutm. '11d, p. 356

Cynipid. Dryophanta emoryi Ashm.

Globular, smooth, green leaf gall, diameter 6 to 12 mm, on red oak. Fig. 95, 96. Bassett '63, p. 326

Cynipid. Small oak apple, Andricus singularis Bas

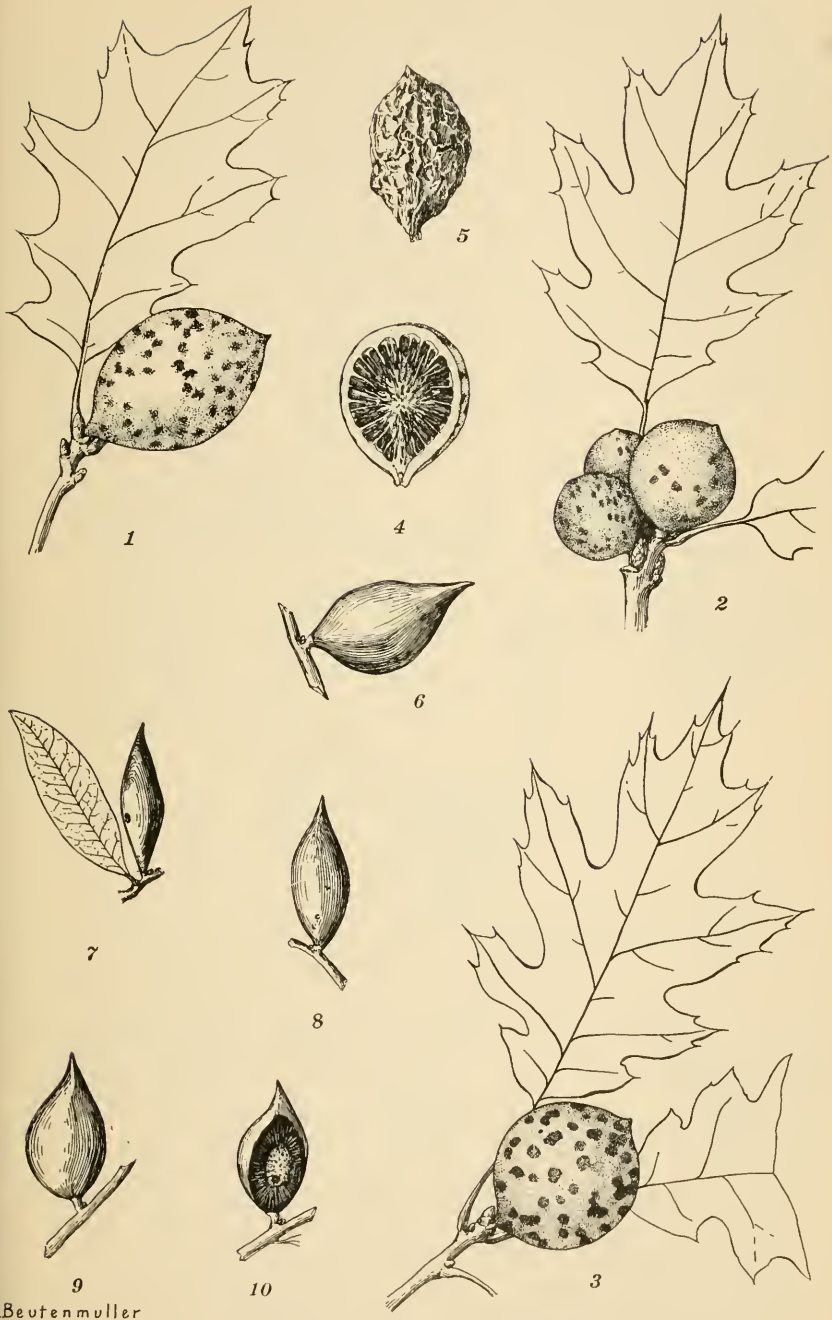

Fig. 94. Oak apples. 1–5. Amphibolips cookii Gill. 6–10. Small pointed oak apple, A. citriformis Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globular, minutely pubescent, reddish, greenish or brownish leaf gall, diameter 4–7 mm, on Q. grisea. Fig. 98.

Cynipid. Cynips sp. a2062

Globose, somewhat oblong, hollow, pale greenish yellow leaf gall with a fiber-supported cell, on Q. ilicifolia and Q. coccinea. Pl. 1, fig. 5. Bassett '63, p. 327

Cynipid. Andricus ostensackenii Bass.

(11) Galls small, the leaf present and the galls tend to cluster

(*a*) Cells central in the gall

Globose, monothalamous, yellow, thin-shelled leaf gall, tinged with red or brown, diameter 10 to 15 mm, the central cell fiber-supported on both surfaces of leaf of Q. minor. Fig. 99, 1–3. Beutm. '11d, p. 349

Cynipid. Polished oak gall, Dryophanta polita Bass.

Fig. 95. Small oak apple, Andricus singularis Bass. Gall on leaf and one in section. (Original)

Fig. 96. Small oak apple, Andricus singularis Bass. A small gall provisionally referred to this species. (Original)

Globose, brown, subopaque leaf galls with a central, fiber-supported cell, diameter 6 to 8 mm, on Quercus sp. Ashm. '97b, p. 68

Cynipid. Trichoteras coquilletti Ashm.

(*b*) Cell basal, against the leaf

Subglobose, flattened basally, leaf galls usually on the midrib, the shell thick, the interior filled with silvery-white hairs supporting a larval cell attached to the base of the gall, on both surfaces of leaf of Q. undulata, Q. gambellii. Fig. 68, 1, 2. Beutm. '11d, p. 348

Cynipid. Dryophanta eburnea Bass.

Gall similar to that of D. eburnea but shining, brownish above and probably on a different species of oak. Beutm. '11d, p. 348

Cynipid. Dryophanta simillima D. T.

Spherical, subcoriaceous, reddish, monothalamous vein gall, developing in fissures of crossveins. Wash. Trotter '11, p. 108

Cynipid. Dryophanta sp.

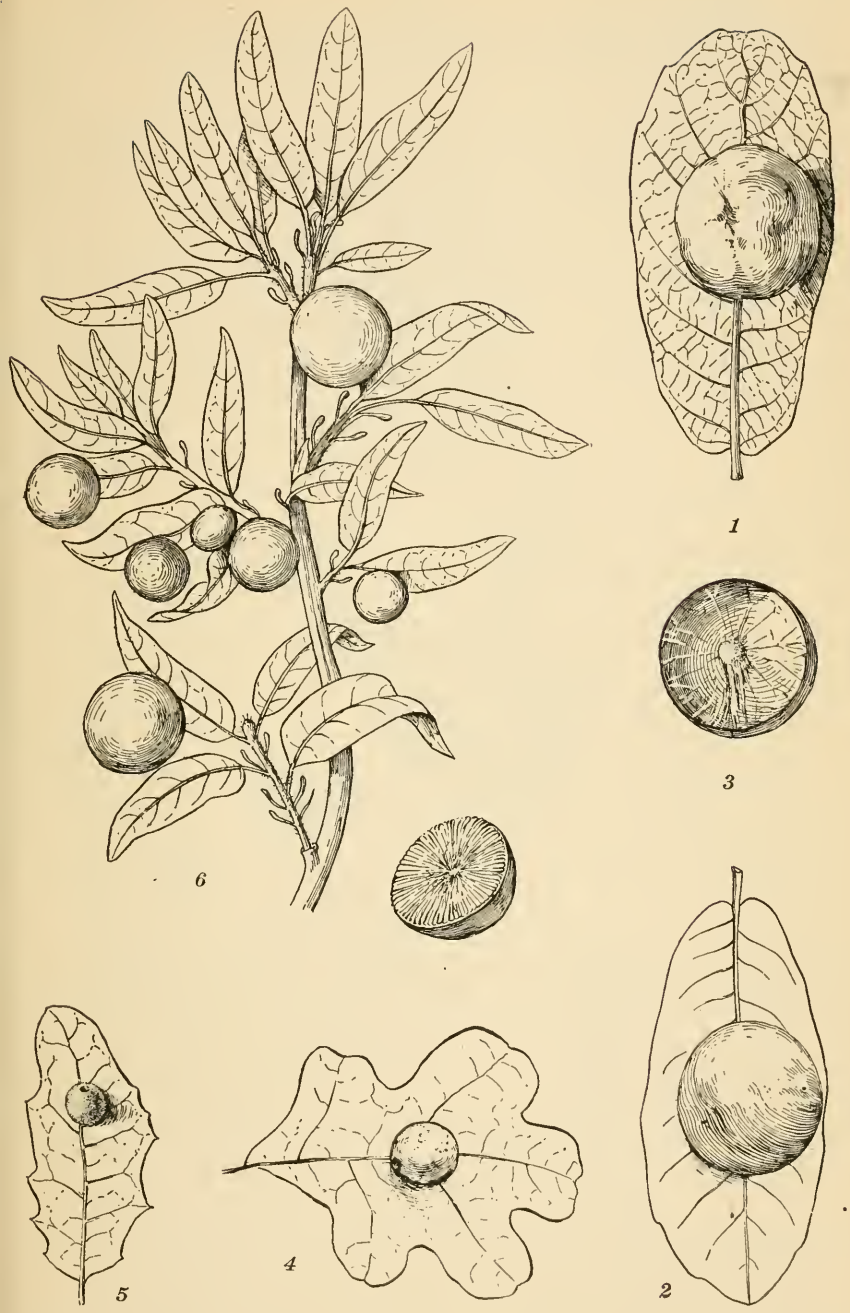

Fig. 97. Dryophanta galls. 1–3. D. bella Bass. 4. D. carolina Ashm. 5. D. multipunctata Beutm. 6, 7. D. dugesi Mayr. (After Beutm., Am. Mus. Nat. Hist.)

Ovate, small, monothalamous apical vein gall developing in a slit, woody, the walls thin, smooth, shining and reddish. Cal. Trotter '11, p. 113

Cynipid. Cynips sp.

(12) Small, thin-walled, globose or fusiform galls, usually marginal, on the leaf and piercing the lamina

Globose, densely pruinose, thin-walled leaf or ament gall, diameter 3 to 3.75 mm, sometimes banded by a minute ridge, on Q. obtusiloba. Bassett '00, p. 311

Cynipid. Andricus pruinosus Bass.

Oval, thin-walled, monothalamous vein swelling covered with a dense, brown pubescence, on Q. alba. Fig. 53, 10. Beutm. '10c, p. 128

Cynipid. Neuroterus pallipes Bass.

Hemispherical or subhemispherical, pale brown, minutely crackled vein gall, diameter 4 mm, height 2.5 mm, on Quercus sp. Fig. 107, 10. Beutm. '10c, p. 125

Cynipid. Neuroterus cockerelli Beutm.

Fig. 98. Cynips sp. on Q. grisea. One shown in section. (Original)

Small, round, thin-shelled galls on leaf blades, usually near the margin and always on the upper leaf veins, projecting on both surfaces, diameter 3.7 mm, on Q. undulata. Bassett '90, p. 77

Cynipid. Andricus pilula Bass.

Hemispherical, pale brown, reticulate leaf gall with minute, reddish tubercles, diameter 3 mm, on Q. undulata. Fig. 108, 8. Beutm. '11d, p. 357

Cynipid. Dryophanta pulchripennis Ashm.

Brown, globose, pedunculate, midrib leaf gall, diameter 3 mm, on Q. rubra. Pl. 2, fig. 1. Ashm. '97, p. 121

Cynipid. Andricus rileyi Ashm.

Ovate, monothalamous, grayish, pubescent vein gall with a very thin wall and joined by a short stem to the side of the vein, length 2.5 mm, diameter 2 mm. Mex. Trotter '11, p. 130

Cynipid. ?Neuroterus ostreatus Trott.

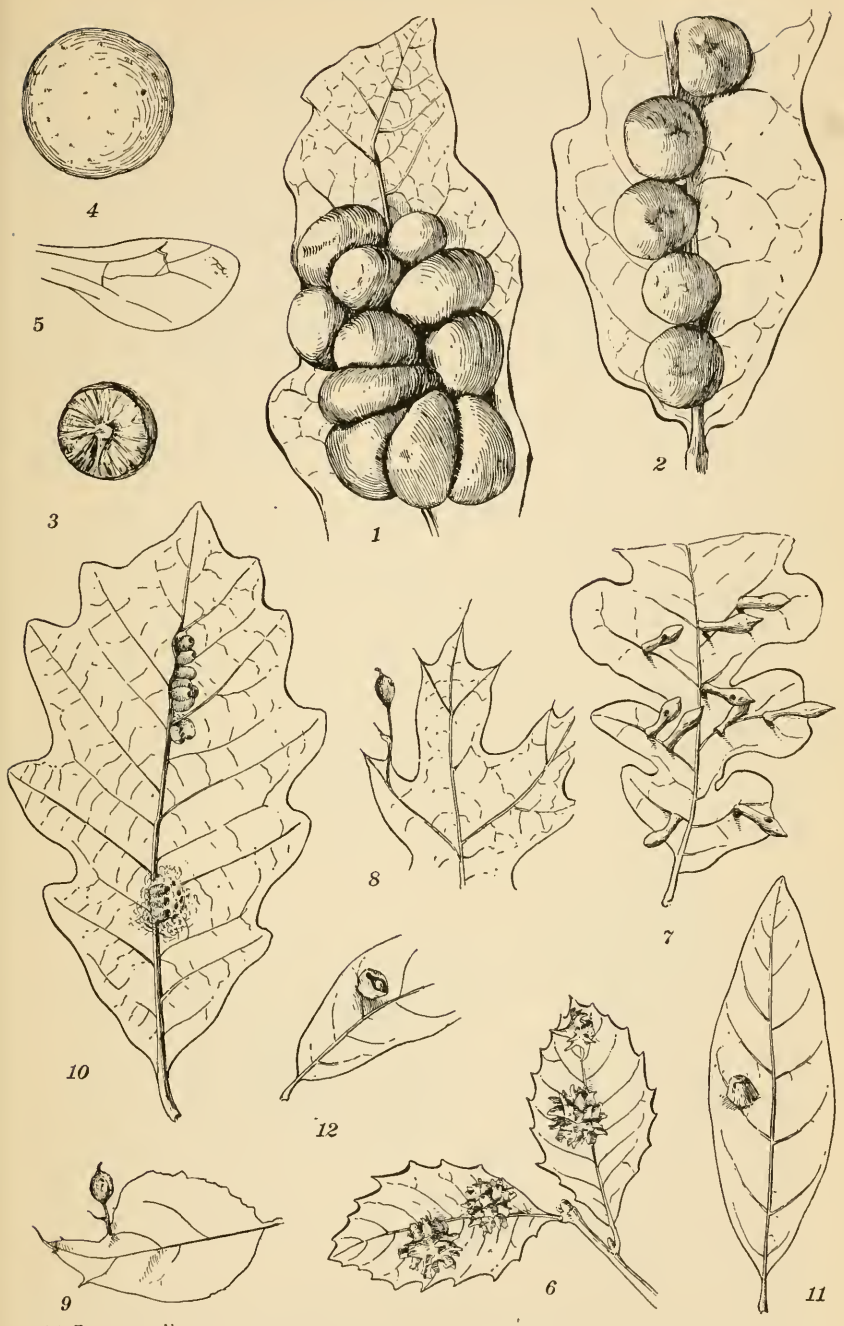

Fig. 99. Dryophanta galls. 1–3. Polished oak gall, D. polita Bass. 4, 5. D. rubrae Karsch. 6. Red sea urchin, D. echina O. S. 7. Clubbed oak leaf gall, D. clavula Beutm. 8, 9. D. pedunculata Bass. 10. D. ignota Bass. 11–12. D. cinereae Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globose, thin-shelled leaf gall with a slight point apically, diameter .75 mm to 1 mm, on Q. undulata, Q. alba, Q. minor and Q. macrocarpa. Fig. 107, 9, 12. Beutm. '10c, p. 125

Cynipid. Jumping bullet gall, Neuroterus saltatorius Hy. Edw.

Globular, green or purplish, pubescent, monothalamous leaf and petiole gall, diameter 3.75 mm, on Q. alba. Bassett '81, p. 78

Cynipid. Andricus utriculus Bass.

(13) Small galls attached to the leaf blades, of various structure and peculiar form

Globose, monothalamous leaf galls with many pointed processes not much shorter than the diameter of the gall, color red or pinkish, covered with a crystalline substance, diameter 5 to 8 mm, on both surfaces of leaf of Q. agrifolia. Fig. 99, 6. Beutm. '11d, p. 351

Cynipid. Red sea urchin gall, Dryophanta echina O. S.

Subconical or convex, the apex subtruncate or almost umbilicate, smooth, brown, reddish, minutely pubescent leaf gall, diameter 4 to 5 mm, height 2.5 to 3.5 mm. Mex. Trotter '11, p. 125

Cynipid. ? Neuroterus sublenticularis Trott.

Cylindrical, fimbriate, bright red and yellow banded leaf gall on live oak, height 4 to 6 mm, diameter 2 to 3 mm, the distal portion hollow, the outer surface with numerous long, yellowish or reddish processes, solitary, Arizona (See A. tubicola, p. 109)

Cynipid. Andricus splendens Weld,[1] MS.

Stellate, reddish brown midvein gall with four subconical, radiating arms, the extreme diameter 5 mm. Mex. Trotter '11, p. 123

Cynipid. ? Cynips sp.

Squash-shaped or top-shaped leaf gall, the marginal ridge produced in 7 to 10 irregular tubercles, brown, with a lilac gray bloom, diameter 6 to 10 mm, height 7 to 10 mm, on Q. douglasii. Fig. 64, 10, 11. Beutm. '09a, p. 37

Cynipid. Spined turban gall, Disholcaspis douglasii Ashm.

Small, wartlike midrib galls on the under surface of the leaves and with corollalike processes apically, on Q. alba. Gill. '89, p. 214

Cynipid. Flowery oak gall, Andricus foliaformis Gill.

Small, irregularly cubical leaf gall with many ridges and pointed projections, length 8 mm, diameter 5 mm, on Q. lobata. Fullaway '11, p. 345

Cynipid. Cynips heldae Fullw.

Hemispherical leaf gall covered with a white, crystallike pubescence, diameter 1.5 to 2.25 mm, on Q. minor. Fig. 107, 5. Beutm. '10c, p. 122

Cynipid. Neuroterus verrucarum O. S.

Spindle-shaped or clavate leaf galls on under surface, length 5 to 7 mm, diameter of narrow part 1 mm, of inflated portion 1.75 mm, on Q. lobata. Fig. 99, 7. Beutm. '11b, p. 67

Cynipid. Clubbed oak leaf gall, Dryophanta clavula Beutm.

Fusiform, green, succulent, thin-shelled leaf gall with a free cell within, occurs singly on the acute lobes of several oaks. Fig. 68, 4. Beutm. '11d, p. 366

Cynipid. Dryophanta notha O. S.

[1] See also, (14) (*b*) on p. 109.

Ovate-acuminate, blisterlike galls on the points of the acute lobes of the leaf, each with a long, hairlike point, on Q. coccinea. Bassett '90, p. 74

Cynipid. Leaf-lobe blister gall, Callirhytis pusulatoides Bass.

Fig. 100. Oak button gall, Neuroterus umbilicatus Bass. One gall shown in section. (Original)

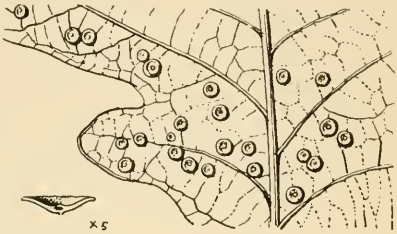

Fig. 101. Oak spangles, Cecidomyia poculum O. S., on Q. alba. One gall shown in section. (Original)

Ellipsoidal, very small, monothalamous, yellowish, minutely pubescent leaf gall occurring on either surface, diameter 1 mm, on opposite side of leaf a yellowish spot with a diameter of 1 to 2 mm. Cal. Trotter '11, p. 119

Cynipid. ? Neuroterus perpusillus Trott.

Rounded, flattened, disklike, monothalamous leaf galls, pinkish or purplish apically, sometimes yellowish, diameter 3 to 4 mm, height 1 mm, on white oak. Fullaway '11, p. 334

Cynipid. Biorhiza californica Beutm.

Small, circular, flattened, brown, monothalamous leaf galls, concave and with a minute, conical elevation centrally, diameter 1 to 1.5 mm, in greatest numbers on the under surface of the leaf, on Q. platanoides. Fig. 85, 7, 100. Beutm. '10c, p. 124

Cynipid. Oak button gall, Neuroterus umbilicatus Bass.

Fig. 102. Oak spangles, Cecidomyia poculum O. S., on Q. muhlenbergiae. One gall shown in section. (Original)

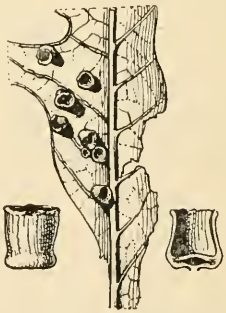

Fig. 103. Oak spangles, Cecidomyia poculum O. S., on Q. macrocarpa. Side view and section of gall. (Original)

Disk-shaped, often flat, greenish leaf galls with a lilac center, the margin irregular, diameter 6 mm, on Q. douglasii. Fullaway '11, p. 352

Cynipid. Andricus pattersonae Fullw

Disk-shaped, flat, hard, smooth, monothalamous galls on the under side of the leaves, diameter 5 to 6 mm, on Q. chrysolepis. Fullaway '11, p. 363

Cynipid. Callirhytis guadaloupensis Fullw.

Button-shaped vein gall with a depressed center and median larval cell having the smoothness and polish of bone, the diameter 10 to 13 mm, height 6.7 mm. Cal. Trotter '11, p. 106

Cynipid. Andricus patelloides Trott.

Saucerlike, small galls frequently on the under side of the leaves, usually clustered and varicolored, diameter 3–5 mm, on Q. alba, Q. macrocarpa, Q. obtusiloba. Pl. 8, fig. 1, 2, fig. 101, 102, 103. Stebb. '10, p. 27

Itonid. Oak spangles, Cecidomyia poculum O. S.

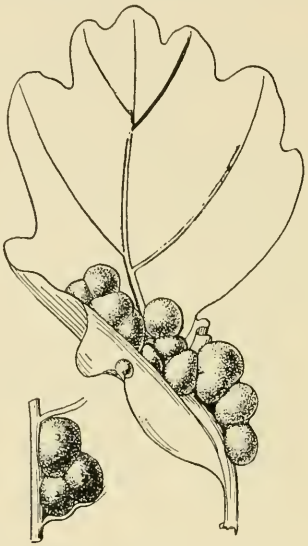

Fig. 104. Gall of Neuroterus majalis Bass. (Original)

Saucer-shaped, sessile, minute, flat, red leaf galls on the under surface, diameter 3 mm, on Q. lobata. Bassett '00, p. 312

Cynipid. Andricus parmula Bass.

Very irregular, flat, green, succulent leaf galls, brown when dry, diameter 6 to 25 mm, height 6 to 9 mm, on Q. alba and Q. prinus. Fig. 85, 4–6, 104. Beutm. '10c, p. 134

Cynipid. Neuroterus majalis Bass.

Flattened, rounded, disklike, monothalamous oak leaf galls, pinkish or purplish, sometimes with a yellowish apex, the sides flat and very thin, diameter 3 to 4 mm, on white oak. Beutm. '11b, p. 69

Cynipid. Philonix californica Beutm.

Broad, ovate, saucer-shaped leaf gall terminating in a slender cone with incurved sides, pubescent, smoky gray, length 6 mm, diameter 5 mm, on Q. douglasii. Bassett '00, p. 316

Cynipid. Andricus kingi Bass.

Saucerlike, flattened, clustered, monothalamous galls with a minute central point, the edge slightly raised, closely resembles gall of Cecidomyia poculum, diameter 1.5 to 2 mm, height .75 mm, on Q. undulata. Fig. 68, 13. Beutm. '11d, p. 368

Cynipid. Dryophanta discus Bass.

Fusiform, marginal, smooth, solitary fold, length 6 mm, diameter 2 mm, the walls somewhat thickened, on live oak. Fig. 105

Cal. Cynipid. Dryophanta sp. a2570

Ovate, pocket-shaped, marginal, pilose leaf fold, usually clustered, sometimes single, length 4 mm, diameter 3 mm, on live oak. Fig. 106

Cal. Cynipid. Dryophanta sp.

Ovate, pocket-shaped, marginal leaf fold with greatly thickened walls, solitary, sometimes in pairs, length 5 to 8 mm. Cal. Trotter '11, p. 108

Itonid. ? Diplosis silvestrii Trott.

Fig. 105. Dryophanta sp., a2570, enlarged. (Original)

Fig. 106. Dryophanta sp. on live oak. Cal. (Original)

Gall a folded leaf edge between serrations. Pl. 8, fig. 5. Ent. News 19:349

Itonid. Marginal fold gall, Itonida foliora Rssl. & Hkr.

Galls similar, possibly identical. Felt. '06b, p. 672

Itonid. Cecidomyia erubescens O. S.

(14) Galls composed apparently of crystalline matter; attached to the leaves

(*a*) Solitary, globular

Globose, pink, thick-walled leaf galls on the under surface, with 50 or 60 short, blunt horns, diameter 9 to 18 mm, on Quercus sp. Bassett '90, p. 81

Cynipid. Handsome oak gall, Andricus speciosus Bass.

Clustered, woolly, bright pinkish leaf galls, the wool crystalline, semitransparent, diameter 3 to 8 mm, on Q. ? agrifolia, Q. dumosa, Q. douglasii. Bassett '00, p. 319

Cynipid. Andricus crystallinus Bass.

(*b*) Clustered, tubular

Tubular leaf gall, length 7 to 10 mm, narrow basally, open apically, yellowish, the surface with numerous red spines, the interior divided by two horizontal partitions, the basal and distal cavities empty, the latter open, on Q. obtusiloba.. Osten Sacken '61, p. 60

Cynipid. Spined oak tube gall, Andricus tubicola O. S.[1]

[1] See also, A. splendens on p. 106

Tubular, monothalamous, yellowish red vein gall, truncate and deeply excavated apically, the walls of the cavity contracted near the top, larval cell just beneath and an empty cavity below, height 7 mm, diameter 5 mm. Wash. Trotter '11, p. 107

Cynipid. ? Trigonaspis vaccinioides Trott

(15) Small, fleshy galls, clustered on leaves

(*a*) Split midvein in their growth

Clusters of seedlike bodies, often 30 to 40 together, occur on the under side of the midvein of red oak leaves, the larger cells smooth, greenish white with an enlarged apex and about the size of grains of wheat, on Q. bicolor, Q. ilicifolia, Q. rubra and Q. coccinea. Pl. 3, fig. 1. Bassett '64, p. 689

Cynipid. Oak leaf seed gall, Cynips decidua Bass.

Clustered, pubescent, globular, drab or brownish red midvein galls, frequently splitting and extending along the vein 4 to 8 cm, diameter 3 to 9 mm, occur in clusters of 10 to 100 or more on a leaf, on Q. rubra. Pl. 1, fig. 6. Bassett '00, p. 314

Cynipid. Andricus piperoides Bass.

Pyriform, usually clustered, reddish brown leaf gall with a minute, whitish pubescence and arising from a slit in the basal two-thirds of the midvein, height 5 to 8 mm. Cal. Trotter '11, p. 117

Cynipid. ? Andricus sp.

(*b*) Do not split midvein in growing

Galls in rounded masses, a few to 30 in each, closely packed, clustered on the under side of the midrib or petiole, monothalamous, globose, pointed basally, greenish, tinged with pink when fresh, grayish when old, individual galls, diameter 2.5 mm to 3 mm, diameter of masses from 6 to 15 mm, on burr oak, dwarf chestnut oak and white oak. Beutm. '13e, p. 245

Cynipid. Cynips dimorphus Gill.

Clustered, bell-shaped, monothalamous, greenish or reddish leaf vein gall, shaped somewhat like a huckleberry blossom, length 3 to 4 mm, on Q. minor. Fig. 84, 6. Beutm. '09, p. 255

Cynipid. Bell-shaped oak gall, Zopheroteras vaccinii Ashm.

Conical, clustered leaf gall attached to the under surface of the midrib, on Q. bicolor. Gill. '89, p. 217

Cynipid. Cynips nigricens Gill.

(16) Galls attached to leaves and covered with woolly fibers

(*a*) Small cells, each with a separate crown of wool

Globose leaf gall, densely covered with coarse, brown, mosslike wool, diamete 1.25 to 2.50 mm, on under side of leaf, on Q. virginiana. Fig. 107, 4. Beutm. '10c, p. 123

Cynipid. Neuroterus minutissimus Ashm.

Globose leaf gall, smooth above, thickly covered with white wool below, single or confluent, diameter 1.5 to 3.5 mm, on Q. alba, Q. platanoides. Fig. 107, 1–3. Beutm. '10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

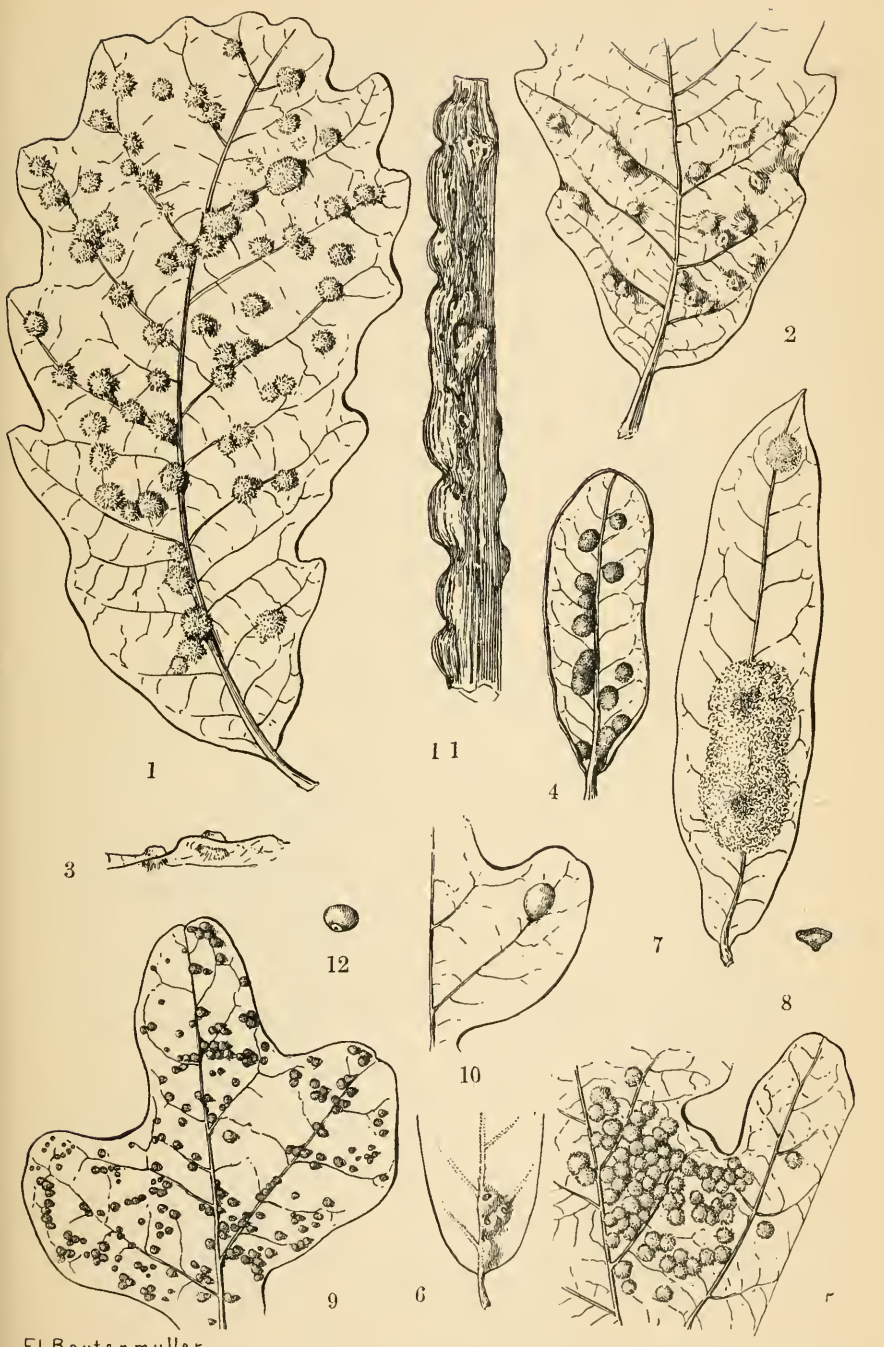

Fig. 107. Neuroterus galls. 1–3. Oak flake gall, N. floccosus Bass., upper, lower and side view. 4. Gall of N. minutissimus Ashm. 5. Gall of N. verrucarum O. S. 6. Gall of N. howertoni Bass. 7, 8. Gall of N. laurifoliae Ashm. 9, 12. Jumping bullet gall, N. saltatorius Hy. Edw. 10. Gall of N. cockerelli Beutm. 11. Gall of N. rileyi Bass. (After Beutm., Am. Mus. Nat. Hist.)

Light brown, budlike, thin-shelled, marginal leaf gall covered with short wool, length 2 to 3 mm, on Q. alba. Fig. 53, 12, 13. Beutm. '10c, p. 132

Cynipid. Neuroterus clarkeae Beutm.

Globose, brown-haired, clustered vein galls, each monothalamous, diameter 2.5 mm on upper surface, usually two or three in a cluster and not showing on the lower surface.

Cynipid. Neuroterus sp. a2762

(*b*) Small, seedlike cells in groups and covered by wool

Woolly, whitish, mass on the under side of the leaves, usually along the midrib, diameter 9 mm, containing a mass of small, monothalamous cells, on Q. alba, Q. macrocarpa, Q. lobata. Pl. 1, fig. 2. Walsh '64, p. 482

Cynipid. Andricus flocci Walsh

Globose leaf gall, smooth above, thickly covered with white wool beneath, singly or confluent, diameter 1.5 to 3.5 mm, on Q. alba, Q. platanoides. Fig. 107, 1–3. Beutm. '10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

Small, flattened, circular or irregular tufts of rather long, whitish or reddish wool covering two to six irregular, brown, seedlike kernels, usually on the under surface, diameter 1.8 to 2 mm. Ashm. '81, p. XIII

Cynipid. Andricus lanigera Ashm.

Clustered, larval cells along the midvein, the cells hidden in short, dense, brownish wool, the largest clusters often more than half the length of the leaf, on Q. obtusiloba. Bassett '81, p. 98

Cynipid. Andricus pattoni Bass.

Oval, rather thick-shelled, brown leaf vein gall, at first woolly, later naked, length 3 mm, diameter 1.5 mm, on Q. platanoides. Fig. 99, 10. Beutm. '11d, p. 359

Cynipid. Dryophanta ignota Bass.

White or buff-colored, woolly masses attached to the principal veins on the under side of the leaves, on Q. alba. Pl. 1, fig. 4. Felt '06b, p. 625

Cynipid. Oak wool gall, Andricus lana Fitch

Monothalamous, clustered, hard, woody, subcylindrical, wedge-shaped or subtriangular leaf galls, each densely covered with short, coarse, whitish woolly fibers, the cluster appearing as one large gall, on Q. minor. Beutm. '09f, p. 248

Cynipid. Andricus texanus Beutm.

Subdiscoidal leaf gall, diameter 3.5 to 5 mm and with whitish gray, transparent, radiating hairs; on the opposite surface a discolored depression with a diameter of 1 mm. Mex. Trotter '11, p. 130

Cynipid. Neuroterus bonanseae Trott.

Button-shaped, golden-yellow haired, vein gall, diameter 10 to 20 mm and consisting of a number of cells, each with a diameter of 3.5 mm and sometimes of 10 mm. Mex. Trotter '11, p. 124

Cynipid. Philonix comata Trott.

(*c*) Cells large, not seedlike but clustered under wool as before

Globose, kernel-like leaf galls occurring singly or in clusters and covered with long, loose, fawn-colored wool, diameter of kernel 2 to 2.5 mm, on Q. laurifolia, Q. imbricaria. Fig. 107, 7, 8. Beutm. '10c, p. 130

Cynipid. Neuroterus laurifoliae Ashm

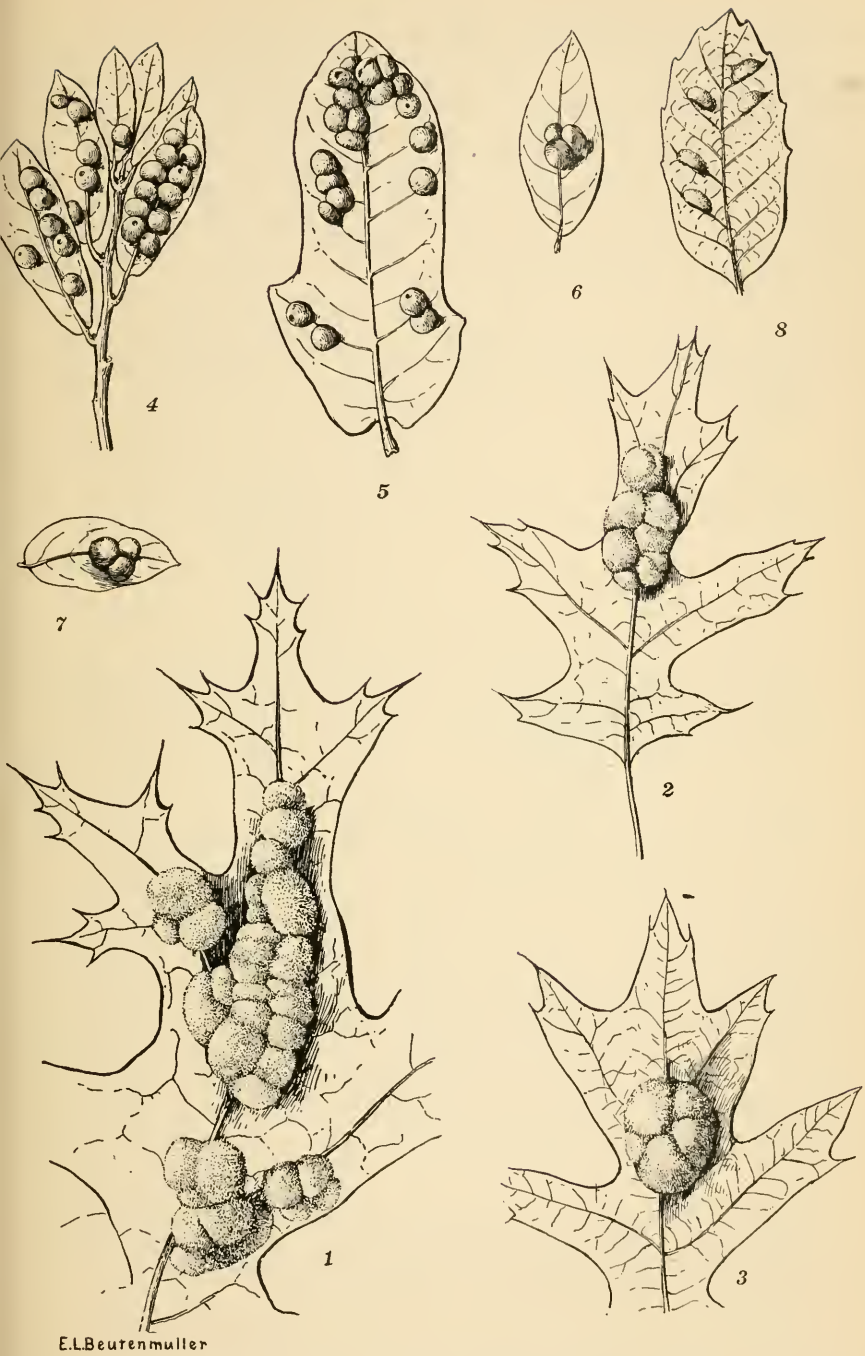

Fig. 108. Dryophanta galls. 1–3. D. lanata Gill. 4–7. D. emoryi Ashm. 8. D. pulchripennis Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globular, fleshy, monothalamous leaf gall with dense, yellow wool, diameter 5 to 6 mm, on upper surface, on Q. catesbaei Ashm. '87, p. 144

Cynipid. Andricus infuscatus Ashm.

Bunches of pale brown wool on under surface of leaf, each with 2 to 8 triangular or irregularly conical cells, diameter 5 to 15 mm, on Q. rubra, Q. coccinea, Q. velutina, Q. marylandica, Q. phellos, Q. nana. Fig. 108, 1–3. Beutm. '11d, p. 350

Cynipid. Dryophanta lanata Gill.

Globular or hemispherical, densely haired, pinkish red clusters of leaf galls, each with 1 to 5 larval cells, diameter 5 to 12 mm, on Q. ?arizonica. Fig. 68, 3. Beutm. '11d, p. 344

Cynipid. Dryophanta nubila Bass.

Monothalamous, clustered, thin-shelled, reddish, woolly oak leaf gall, individual galls, diameter 1 to 1.5 mm, height 2 mm, on Q. lobata. Beutm. '13c, p. 244

Cynipid. Andricus fullawayi Beutm.

Fig. 109. ?Callirhytis flocculenta Trott. on live oak. (Original)

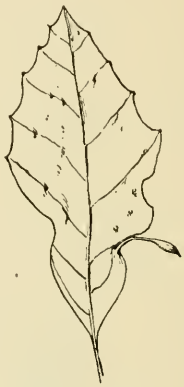

Fig. 110. Oak capsule gall, Andricus capsulus Bass. (Original)

Globose, grayish brown, clustered leaf gall, sometimes slightly flattened basally, irregularly wrinkled and covered with dense, short, woolly hairs, diameter 8 mm, on Q. lobata. Fig. 97, 5. Beutm. '11b, p. 67

Cynipid. Dryophanta multipunctata Beutm.

Subelliptical or subcylindrical, yellowish vein gall with long, yellowish hairs and ordinarily in clusters of two to three, length about 3 mm, differs from A. infuscatus by the greater thickness of the walls. Cal. Trotter '11, p. 116

Cynipid. Andricus sp.

Depressed, hemispherical, grayish red vein gall, the mass with a diameter of 5 to 15 mm, individual galls, subpyramidal, the surface rough and with clusters of minute, whitish hairs, major diameter 5 to 6 mm, diameter of base 4 to 5 mm. Cal. Trotter '11, p. 119

Cynipid. ?Cynips sp.

(*d*) Cells small and bonded together by a hard substance

Hemispherical, hard, polythalamous leaf gall covered with pale yellowish wool, more or less ringed with ferruginous, stem entirely rust-red, resembles A. floccus, diameter 5 to 9 mm, occurs on both surfaces of Q. chrysolepis. Ashm. '97, p. 132

Cynipid. Callirhytis lasius Ashm.

Densely haired, russet-colored, hemispherical masses attached by a small point to the upper surface of the leaf, diameter 12 to 18 mm, on Quercus sp. Bassett '81, p. 92

Cynipid. Bassettia tenuicornis Bass.

(*e*) Polythalamous, under wool

Woolly, rusty, yellowish brown, polythalamous midvein gall, dimensions 2 by 3 cm on Q. ? crassifolia. Bassett '90, p. 78

Cynipid. Andricus mexicanus Bass.

(*f*) Monothalamous, large

Irregular, lemon-shaped, monothalamous oak apple, length 8 to 10 mm, diameter 5 to 7 mm, thickly covered with whitish, fulvous hairs. Fig. 109. Cal. Trotter '11, p. 115

Cynipid. ?Callirhytis flocculenta Trott.

(17) Galls on pedicels attached to the leaves

Elongate or fusiform, pointed leaf or twig gall, usually with a long pedicel, the prolongation of a leaf vein, pale green, thin-shelled and with an oblong, thin larval cell supported by radiating fibers, length 20 to 25 mm, diameter 4 to 8 mm, on Q. coccinea and Q. rubra. Fig. 92, 8–10. Beutm. '09b, p. 56

Cynipid. Oak spindle gall, Amphibolips coelebs O. S.

Elongate, fusiform, stemmed leaf gall mostly on the margin, sometimes on the surface, length of stems 5 mm, of the fusiform gall 3 to 4 mm, on Q. alba. Osten Sacken '61, p. 61

Cynipid. Small oak spindle gall, Andricus fusiformis O. S.

Slender, globe-shaped, leaf galls nearly 12 mm long, the stalk twice as long as the swelling, the surface pubescent, on Q. prinoides Fitch '51, p. 820

Cynipid. Andricus chinquapin Fitch

Monothalamous, marginal, stemmed leaf gall, length of stem 12 to 18 mm, length of gall 10 mm, diameter of gall 3 mm, on Q. bicolor. Fig. 110, Bassett '81, p. 101

Cynipid. Oak capsule gall, Andricus capsulus Bass.

Fusiform, stemmed, green or dark olive-brown leaf gall with a free cell within, length 4 to 5 mm, diameter 2.5 to 3 mm, on Q. rubra and Q. coccinea. Fig. 99, 8, 9. Beutm. '11d, p. 366

Cynipid. Dryophanta pedunculata Bass.

Fusiform, pedunculate, smooth, reddish brown vein gall, length 8 to 10 mm, the stem slender, smooth, length mm. Cal. Trotter '11, p. 105

Cynipid. Andricus pseudo-callidoma Trott.

Globose or fusiform, stemmed, smooth, shining, dark-brown leaf gall, length 4 cm, greatest diameter 3.5 to 4.5 mm, length of stem 4 to 6 or 8 mm. Mex. Trotter '11, p. 123

Cynipid. ? Andricus longepedunculatus Trott.

(18) Presumably leaf galls, the gall unknown

Reared from oak, presumably from a gall resembling that made by Cynips. Felt '08e, p. 391

Itonid. Thecodiplosis quercifolia Felt

Probably reared from oak leaves. Felt '07a, p. 137

Itonid. Dicrodiplosis quercina Felt

7 *Galls of the aments or catkins*

Clavate, irregular, rather angulate, thin-shelled, polythalamous, clustered, staminate, brown, ament gall, diameter 3 or 4 mm, on Q. agrifolia. Fullaway '11, p. 339

Cynipid. Dryophanta dubiosa Fullw.

Globular, woolly gall, diameter 12 mm, on Q. aquatica. Ashm. '81, p. XVI

Cynipid. Andricus turneri Ashm.

Rounded, shotlike, greenish white, soft, spongy, polythalamous gall on red oak catkins. Pl. 2, fig. 7. Bassett '90, p. 73

Cynipid. Oak flower gall, Callirhytis pulchra Bass.

Conical, monothalamous blossom galls, dark brown or black when dry, length 2.5–3 mm, on Q. myrtifolia. Beutm. '17, p. 346

Cynipid. Andricus myrtifoliae Beutm.

Ovate, smooth, blossom galls, diameter 1 mm, on Q. cinerea. Ashm. '87, p. 143

Cynipid. Andricus blastophagus Ashm.

Nodular enlargements of the flower cluster, more or less concealed by the floret. They are small, succulent and shrivel soon after the flies emerge, on Q. minor. See also, fig. 107, 1–3. Beutm. 10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

Oval, small, short, dark slate colored, ament galls, length 1.25 mm, diameter 1 mm, on Q. obtusiloba. Bassett '00, p. 318

Cynipid. Andricus exiguus Bass.

Small, black, polythalamous galls in sterile florets of Q. ilicifolia, occasionally very abundant, diameter 2.5 mm. Bassett '90, p. 79

Cynipid. Callirhytis clarkei Bass.

Globose, monothalamous, pale wood colored galls in dense clusters near the ends of the aments, on Q. platanoides. Fig. 53, 7. Beutm. '10c p. 129

Cynipid. Oak flower stem gall, Neuroterus pallidus Bass

Globose, moderately thick-shelled, yellowish, almost smooth, pithy gall, diameter 20 to 35 mm, possibly on oak blossoms. Fig. 111, 8, 9. Beutm. '09b, p. 65.

Cynipid. Amphibolips trizonata Ashm.

Reared from undescribed oak blossom galls. Felt '08e, p. 325

Itonid. Lasioptera querciflorae Felt

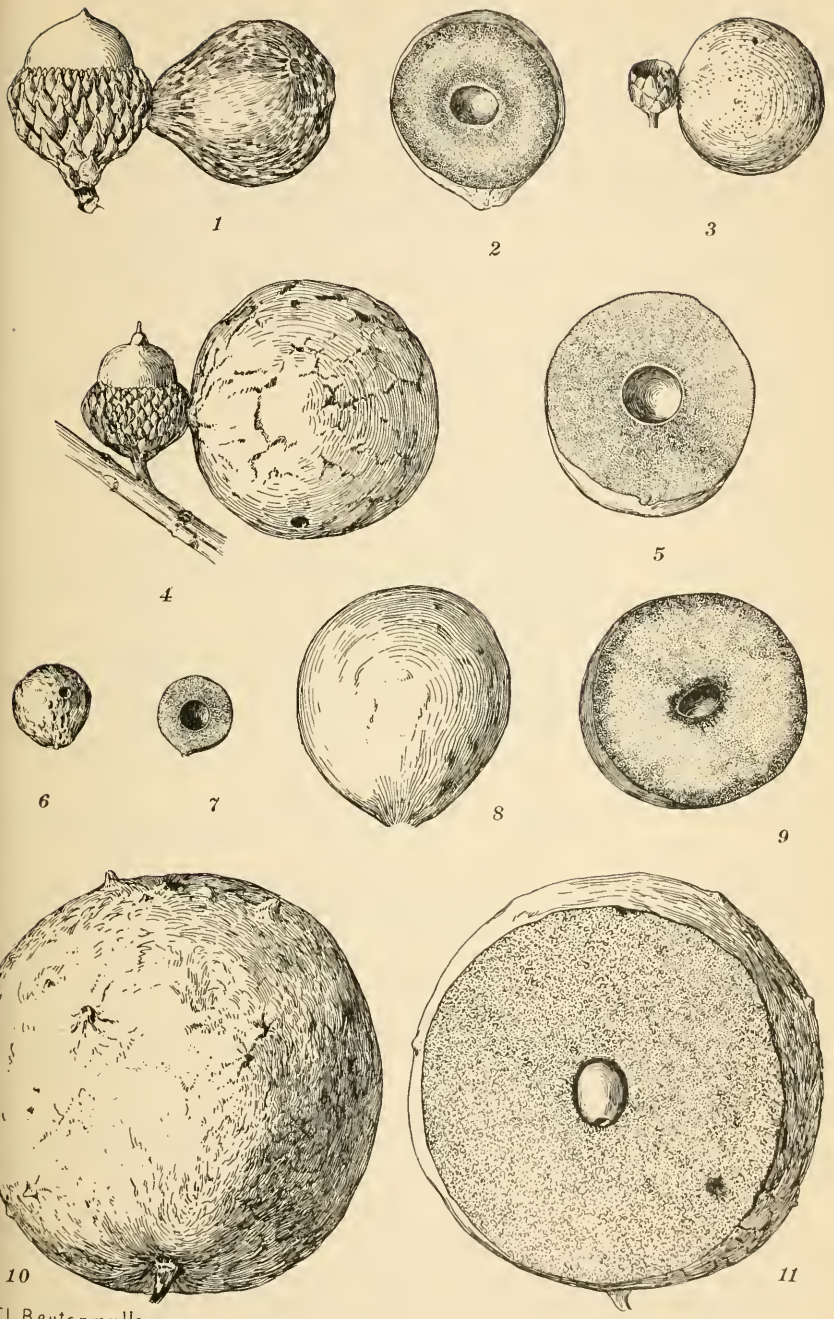

Fig. 111. Oak apples. 1–3. Acorn plum gall, Amphibolips prunus Walsh. 4, 5. A. ainesi Bass. 6, 7. A. fuliginosa Ashm. 8, 9. A. trizonata Ashm. 10, 11. 'almer's oak apple, A. palmeri Bass. (After Beutm., Am. Mus. Nat. Hist.)

8 Galls of the fruits

a Galls of the acorn

Inhabiting apparently normal, small acorns or those slightly deformed, on Q. ilicifolia. Pl. 1, fig. 7. Beutm. '13e, p. 105

Cynipid. Andricus perditor Bass.

White kernel or larval cell in the meaty portion of acorns, though sometimes outside near its base and hidden by the cup, on scarlet, red and black oak and probably in others of the red oak group. Beutm. '13e, p. 102

Cynipid. Callirhytis fruticola Ashm.

Gall similar to that of C. fruticola probably new, and occurring in the acorns of swamp oak, Q. platanoides, found by L. H. Weld. Beutm. '13e, p. 102

Cynipid. ?Callirhytis sp.

Acorns containing rounded bodies or larval cells, sometimes filling the whole interior and resembling those of C. fruticola, on Q. agrifolia. Beutm. '13e, p. 105

Cynipid. Andricus eldoradensis Beutm.

Acorns containing 1 to 5 or 6 pseudochestnut-shaped galls, the latter varying in size from that of a flax seed to a length of 8 mm (spring form, C. operatola Ril. & Bass.) Bassett '00, p. 315

Cynipid. Andricus operator O. S.

Monothalamous acorn galls at the tip of leaf twigs, double, the basal portion smaller and telescoped in the upper part, rugose, with a whitish bloom, length 15 mm, on Q. chrysolepis. Fullaway '11, p. 363

Cynipid. Callirhytis sanctae-clarae Fullw.

Bud gall, possibly acorn gall composed of a basal, oblate part with a height of 3 to 4 mm and a distal conico-pyramidal portion with a height of 10 to 12 mm and a diameter of 8 to 12 mm, the larval cell in the basal portion. Trotter '11, p. 109

Cynipid. Disholcaspis sp.

Reared from larvae found between the seed coats of an acorn. Felt '15e, p. 137

Itonid. Dasyneura glandis Felt

b Galls of the acorn cup (cupule)

Globose, bright red acorn-cup gall, the fresh flesh pink, shading to yellow toward the middle, at maturity blood-red, diameter 15 to 25 mm, on Q. rubra, Q. nana, Q. velutina and Q. coccinea in August and September. Fig. 111, 1–3. Beutm. '09b, p. 62

Cynipid. Acorn plum gall, Amphibolips prunus Walsh

Globular, smooth, densely corky, acorn-cup gall, internally rusty brown, with a large larval cell, diameter 24 to 42 mm, on Q. marilandica. Fig. 111, 4, 5. Beutm. '09b, p. 63

Cynipid. Amphibolips gainesi Bass.

Irregular, monothalamous, conical swellings of the cupule, length 5 mm, diameter 2 mm, on Q. platanoides, Q. macrocarpa, Q. prinoides and Q. prinus. Beutm. '13e, p. 103

Cynipid. Andricus glandulus Beutm.

Flattened, toothlike or wedge-shaped galls on the outside of the acorn and between the cup and the acorn, the ends usually protruding more or less on red, scarlet, black and scrub oak (fall form). Pl. 2, fig. 5. Beutm. '13e, p. 103

Cynipid. Andricus operator O. S.

Seedlike capsule in acorn cup, on Q. alba, Q. prinus and allied oaks. Pl. 3, fig. 4. Riley '75, p. 577

Cynipid. Cynips glandulosus Riley

Globose, small, red, smooth, corky, probably acorn galls, diameter 8 to 12 mm, on Q. laurifolia. Fig. 111, 6, 7. Beutm. '13e, p. 102

Cynipid. Amphibolips fuliginosa Ashm.

9 *Supplementary list of gall-making Cynipids, the galls being unknown*

Amphibolips montana Beutm. '13 Insec. Inscit. Menst., 1:122
A. nigra Beutm. '11 Ent. News, 22:198
A. verna Bass. '00 Am. Ent. Soc. Trans., 26:321

Fig. 112. Woolly elm louse, Schizoneura rileyi Thos. Twig enlargement. (Original)

Fig. 113. Aborted buds on slippery elm, possibly the work of Dasyneura ulmea Felt. (Original)

Andricus ashmeadi Bass. '00 Am. Ent. Soc. Trans., 26:320
A. aztectus Cam. '97 Ann. Nat. Hist., 19:261
A. brevicornis Beutm. '13 Am. Ent. Soc. Trans., 39:245
A. ignotus Bass. '00 Am. Ent. Soc. Trans., 26:317
A. incertus Bass. '00 Am. Ent. Soc. Trans., 26:317
A. durangensis Beutm. '11 Ent. News, 22:198
A. lustrans Beutm. '13 Am. Ent. Soc. Trans., 39:244
A. obtusilobae Bass. '00 Am. Ent. Soc. Trans., 26:316
A. patiens Bass. '00 Am. Ent. Soc. Trans., 26:312
A. pulchellus Bass. '00 Am. Ent. Soc. Trans., 26:314
Aylax quinquecostata Prov. '80 Nat. Canad., 14:20
A. rufipes Cam. '84 Ent. Soc. Lond. Trans., p. 485
Aulacidea harringtoni Ashm. '87 Am. Ent. Soc. Trans., 14:146
Callirhytis arcuata Kieff. '09 Lab. Zool. Portici Bul., 4:341

C. defecta Kieff. '09 Lab. Zool. Portici Bul., 4:116
Chilaspis ferrugineus Gill. '90 Ill. State Lab. of Nat. Hist. Bul., 3:200
Cynips flavicollis Ashm. '96 U. S. Nat. Mus. Proc., 19:123
C. gibbosa Prov., '81 Nat. Canad., 12:232
Diastrophus piceus Prov. '86 Add. Faune Canad., Hym., p. 161
Disholcaspis heynei Kieff. '09 Lab. Zool. Portici Bul., 4:113
Dryophanta corrugis Bass. Beutm. '11 Amer. Mus. of Nat. Hist. Bul., 30:353
D. parvula Bass. '00 Am. Ent. Soc. Trans., 26:326
D. pulchella Beutm. '14 Ent. News, 22:357
Holocynips emarginata Kieff. '09 Lab. Zool. Portici Bul., 4:114
Neuroterus dubius Bass. '00 Am. Ent. Soc. Trans., 26:335
N. crassitelus Prov. Nat. Can., 12:233

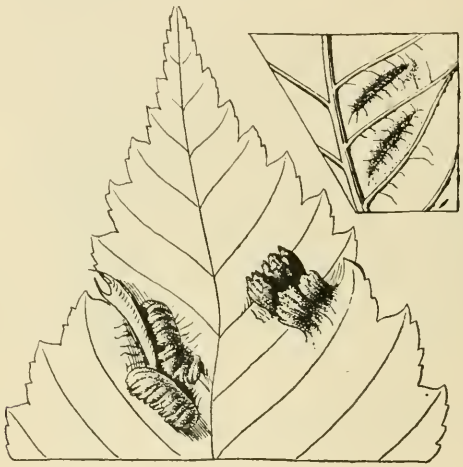

Fig. 114. Cockscomb elm gall, Colopha ulmicola Fitch, showing upper and lower surface of leaf. (Original)

Phamacis americana Baker. '96 Can. Ent., 28:131
Trissandricus maculipennis Kieff. '09 Lab. Zool. Portici Bul., 4:115

Urticaceae (nettle family)

Ulmus (elm)

Reared from larvae under decaying bark. Felt '13m, p. 224
Itonid. Oligarces ulmi Felt
Knotty growths on the trunk and branches, usually covered with woolly plant-lice, on U. americana. Fig. 112. Felt '06b, p. 192
Aphid. Woolly elm louse, Schizoneura rileyi Thos.
Aborted or blasted buds. Fig. 113, pl. 10, fig. 3. Felt '15e, p. 171
Itonid. Dasyneura ulmea Felt
Blasted leaf buds or adherent, immature leaf clusters. Pl. 11, fig. 6. Felt '12f, p. 240
Itonid. Phytophaga ulmi Beutm.

Thickened, green or reddish, crested, cockscomb-shaped ridges arising from lateral veins, length 10 to 15 mm, height 8 mm. Fig. 114. Felt '06b, p. 186

Aphid. Cockscomb elm gall, Colopha ulmicola Fitch

Spindle-shaped, hollow gall on the upper surface of the leaf, variable in size, length about 15 mm, on slippery elm. Fig. 115. Felt '15e, p. 58

Aphid. Slippery elm pouch gall, Pemphigus ulmifusus Walsh

Fig. 115. Slippery elm pouch gall, Pemphigus ulmifusus Walsh. (Author's illustration)

Fig. 116. Elm sack gall, Tetraneura ulmisacculi Patch. (Author's illustration)

Globose, subsessile, yellowish green, sometimes pink-tinted leaf gall, diameter 5 to 12 mm, on U. montana. Fig. 116. Felt '15e, p. 57

Aphid. Elm sac gall, Tetraneura ulmisacculi Patch

Curled and twisted leaves containing numerous mealy-covered Aphids, on U. americana. Felt '06b, p. 177

Aphid. Elm leaf aphid, Schizoneura americana Ril.

Globose, green or yellowish green, pocket galls, on U. americana, U. racemosa, U. fulva. Chadwick '08, p. 149

Acarid. Eriophyes sp.

Large, pouch gall, diameter 1 to 2 cm, on U. fulva. Chadwick '08, p. 149
Acarid. Eriophyes sp.

Pubescent, pouch gall, diameter 3 to 6 mm, on U. fulva. Chadwick '08, p. 149
Acarid. Eriophyes sp.

Whitish erineum on the under side of the leaf of U. racemosa. Chadwick '08, p. 150
Acarid. Eriophyes sp.

Celtis (hackberry)

"Witch-broom" on branches and twigs. Chadwick '08, p. 130
Acarid. Eriophyes sp.

Fig. 117. Hackberry bud gall, Pachypsylla gemma Riley. Infested twig and one gall in section, the latter enlarged. (Original)

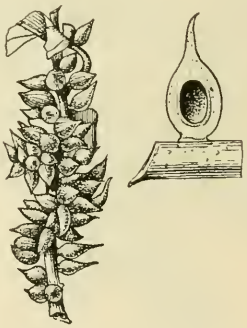

Fig. 118. Hackberry flask gall, Phytophaga celtiphyllia Felt. Cluster of galls and one in section, the latter enlarged. (Original)

Hollow, elongate twig swellings, length 1.25 to 2.5 cm. Patton '97, p. 247
Itonid. Cecidomyia deserta Patt.

Fusiform bud gall, length 1.5–3 cm, diameter 4–6 mm. Wells '16, p. 258
Lepidopt. ? Proteoteras aesculana Ril.

Twig galls resembling seed capsules of Rumex, apically with a spine about one-half the length of the gall, the height, excluding the spine, 4.5 mm, the diameter approximately the same. Pack. '90, p. 613
Itonid. Cecidomyia semenrumicis Patt.

Bud-shaped, polythalamous twig gall without an opening. Fig. 117. Pack. '90, p. 615

Hemip. Hackberry bud gall, Pachypsylla gemma Ril.

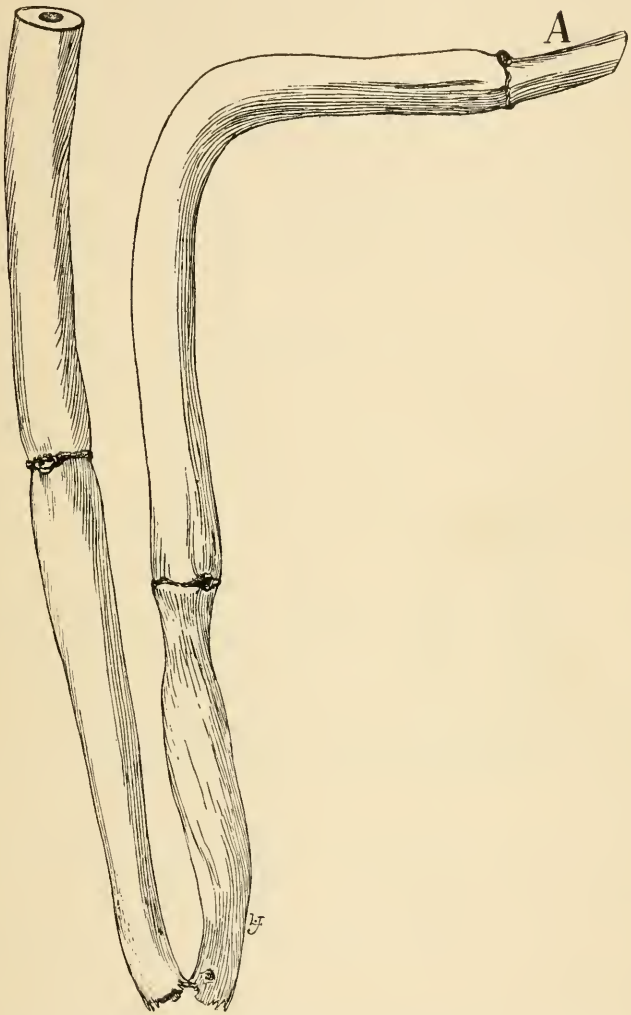

Fig. 119. Hop stem gall, Lasioptera humulicaulis Felt. (Author's illustration)

Conical, spine-shaped leaf gall on the under surface and arising from a circular, yellowish base, height 4 mm, diameter 2.8 mm. Pack. '90, p. 614

Itonid. Spiny hackberry gall, Cecidomyia spiniformis Patt.

Globular, subsessile, small leaf gall with a small impression at the top, not pubescent. Pack. '90, p. 621

Hemip. Pachypsylla globulus Ril.

Top-shaped, monothalamous, moderately thick leaf gall, the surface sparsely clothed with whitish, appressed pubescence, the greatest diameter 3 to 4 mm. Felt '16f, p. 190

Itonid. Phytophaga wellsi Felt

Rosette-shaped, ribbed leaf gall resembling the seed capsule of Hibiscus, on under surface of leaf, diameter 2 to 3 mm. Pack. '90, p. 614

Itonid. Cecidomyia capsularis Patt.

Reniform, large, petiole gall involving the base of the leaf and with an opening, polythalamous. Pack. '90, p. 617

Hemip. Hackberry petiole gall, Pachypsylla venusta O. S.

Mammiform, very large leaf gall without a depression or rim on the top, usually not pubescent, sometimes with a slight down at the base, diameter 4.5 mm. Pl. 14, fig. 2. Pack. '90, p. 619

Hemip. Hackberry nipple gall, Pachypsylla mamma Ril.

Elevated, mammiform, with a long nipple-like protuberance, diameter 6 mm, on under surface of leaf of C. reticulata. Cockerell, '10, p. 180

Hemip. Pachypsylla rohweri Ckll.

Subglobular, sessile, smaller leaf gall with long hairs and with a smooth, shining impression on the upper surface, diameter 3 mm. Pack. '90, p. 620

Hemip. Pachypsylla pubescens Ril.

Leaf gall resembling that of Pachypsylla pubescens but with no cup-shaped depression on the upper surface of the leaf, diameter 3.5 to 4 mm. Pack. '90, p. 613

Itonid. Cecidomyia pubescens Patt.

Circular, depressed leaf gall on the upper surface, the outer rim depressed, the central part slightly raised and with a median spine; wartlike on the under surface, much flattened and with a depression in the middle; height 2 mm, diameter 5 mm. Pack. '90, p. 619

Hemip. Hackberry button gall, Pachypsylla umbilicus Ril.

Star-shaped or flower-shaped leaf gall and not forming a depression on the under side, on the upper surface blisterlike, height 1.25 mm, diameter 5 mm. Pack. '90, p. 618

Hemip. Hackberry star gall, Pachypsylla asteriscus Ril.

Blisterlike, yellowish, monothalamous gall occurring on both sides of the leaf and hardly raised above the surface. Pack. '90, p. 618

Hemip. Hackberry blister gall, Pachypsylla vesiculum Ril.

Globose, not pubescent, sessile leaf gall, wider than high, much flattened on the top and usually with two concentric, elevated rims and a central nipple. Pack. '90, p. 621

Hemip. Hackberry melon gall, Pachypsylla cucurbita Ril.

Conical, flask-shaped or subglobular, slightly ribbed, greenish leaf or tender twig gall arising from a circular, truncate base, diameter 3.4 mm. Fig. 118. Felt '08e, p. 371

Itonid. Hackberry flask gall, Phytophaga celtiphyllia Felt (oviformis Patt.)

Subconical leaf gall, clustered on the under surface, length 3 to 5 mm. Beutm. '07c, p. 388

Itonid. Cecidomyia unguicula Beutm.

Subconical, solitary or compound leaf, stem, petiole or fruit gall with a bluntly truncate, dehiscent larval cell, diameter about 4 mm. Wells '16, p. 277
Itonid. Cecidomyia sp.

Humulus (hop)

Swollen stems, diameter 1 cm, length 4 to 50 cm. Fig. 119. Felt. '07a, p. 151
Itonid. Hop stem gall, Lasioptera humulicaulis Felt

Urtica (nettle)

Globose, hoary, pubescent, yellowish white gall on the under surface of the leaf, diameter 4 mm. Pl. 7, fig. 8. Felt '11j, p. 474
Itonid. Nettle bullet gall, Cecidomyia sp.

Urn-shaped, subsessile, pale green midrib or vein gall, diameter 3 mm. Osten Sacken '75, p. 202
Itonid. Nettle urn gall, Cecidomyia urnicola O. S.

Laportea (wood nettle)

Irregular, oval, stem gall. Felt '11j, p. 463
Itonid. Cecidomyia sp.

Fig. 120. Cecidomyia sp. Bud gall on Laportea. (Original)

Fig. 121. Cecidomyia boehmeriae Beutm. Stem gall. (Original)

Irregular, probably bud gall, length 1.2 cm. Fig. 120. Felt '11j, p. 463
Itonid. Cecidomyia sp.

Boehmeria (false nettle)

Fusiform stem gall, length 12 mm, diameter 6 mm. Fig. 121. Beutm. '08, p. 74
Itonid. Cecidomyia boehmeriae Beutm.

Aristolochiaceae (birthwort family)

Aristolochia (birthwort)

Ovate leaf gall, diameter 4 mm. Hagen '81, p. 37
Itonid. Cecidomyia hageni Aldr.

Small, woolly capsule on under surface of the leaf, on A. macrophylla. Chadwick '08, p. 127
? Acarid. Eriophyes sp.

Polygonaceae

Eriogonum

Elongate, bud swelling. Felt, '11j, p. 460

Itonid. Cecidomyia sp.

Rumex (dock)

Reared from deformed, reddish seeds. Felt, '08e, p. 392

Itonid. Dock seed midge, Contarinia rumicis Loew

Reared from same gall. Felt, '08e, p. 410

Itonid. Lestodiplosis rumicis Felt

Coccolobis revifera (sea grape)

Blister leaf gall, dark green, with a darker median nipple showing equally on both surfaces, diameter 5 mm. Fig. 122, Felt, '15a, p. 199

Itonid. Sea grape blister, Ctenodactylomyia watsoni Felt

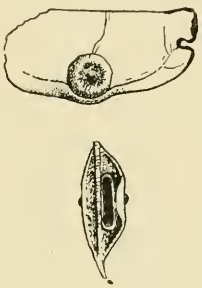

Fig. 122. Sea grape blister gall, Ctenodactylomyia watsoni Felt. Gall and one in section, the latter enlarged. (Original)

Fig. 123. Greasewood bud gall, Onodiplosis sarcobati Felt. (Original)

Chenopodiaceae (goosefoot family)

Eurotia

Irregular bud galls. Felt, '11j, p. 460

Itonid. Cecidomyia sp.

Sarcobatus vermiculatus (greasewood)

Irregularly oval bud galls, fleshy, becoming hard and apparently composed of closely appressed, thickened bud scales, length 10 mm, diameter 6 mm. Fig. 123. Felt, '16f, p. 176

Itonid. Greasewood bud gall, Onodiplosis sarcobati Felt

Somewhat produced, axillary, rosette bud galls, length 1.5 cm, diameter .5 cm. Collected by L. H. Weld.

Dipt. Trypetid a2772

Swollen, folded leaflets, length 12 mm, diameter 1.5 mm. Felt, '16c, p. 202

Itonid. Greasewood leaf gall, Protaplonyx hagani Felt

Oval leaf swellings. Felt '14i, p. 93

Itonid. Aplonyx sarcobati Felt

Atriplex

Irregular, subglobular bud galls with sparse, long hairs, diameter 8 to 9 mm. Fig. 124. Cockerell '96, p. 402. Felt '16d, p. 139

Itonid. Atriplex bud midge, Asphondylia neomexicana Ckll.

Fleshy, polythalamous, tumorlike twig gall, length 12 mm, diameter 4.5 to 6 mm. Fig. 125. Amer. Nat. 29:766. Felt '16d, p. 138

Itonid. Atriplex tumor gall, Asphondylia atriplicis Ckll.

Irregular twig gall, length 1.5 mm, diameter 5 mm. Fig. 126. Cockerell '98, p. 327

Itonid. Lasioptera willistoni Ckll.

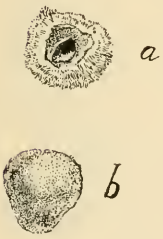

Fig. 124. Atriplex bud midge, Asphondylia neomexicana Ckll. (Author's illustration)

Fig. 125. Atriplex tumor gall, Asphondylia atriplicis Ckll. (Original)

Circular, pustulate leaf gall, diameter 2.5 mm. Cockerell '98, p. 326

Itonid. Atriplex leaf blister, Cecidomyia atriplicicola Ckll.

Woolly masses 1 to 2 cm long on the stems, evidently appressed, aborted leaves, on A. ?polycarpa

Itonid. Asphondylia ? atriplicis Ckll. a2893

Globose, sessile, whitish, short-haired galls, diameter 4 mm, on A. confertifolia

Itonid. Asphondylia atriplicis Ckll.

Subglobose or lenticular, apposed leaf galls, diameter 3 to 4 mm, length 6 or 7 mm. Cockerell and Rohwer, '08, p. 169. Fig. 127

Hemip. Atriplicia ?gallicola Ckll. a2478

Longitudinally curled, apposed leaves, length 5 to 6 mm, diameter 1 to 1.5 mm. Fig. 128

Hemip. Coccid sp. a2479

Suaeda or Dondia (Sea blite)

Blackish, globose, sessile, leafy deformations, diameter 3 mm. Felt '18d, p. 381

Itonid. Asphondylia dondiae Felt, MS.

Phytolaccaceae (poke weed family)

Rivina (rouge-plant)

Reared from bud gall. Felt '16d, p. 112

Itonid. Schizomyia rivinae Felt

Nyctaginaceae (four-o'clock family)

Oxybaphus

Stem gall, length 1.5 to 2 cm. Felt '11k, p. 482

Itonid. Lasioptera allioniae Felt

Fig. 126. Lasioptera willistoni Ckll. (Original)

Fig. 127. Coccid gall on Atriplex, a2478 (Original)

Fig. 128. Coccid gall on Atriplex casnescens, a2479. (Original)

Pisonia

Subconic, stem gall on P. aculeata. Felt '11k, p. 547

Itonid. Feltomyia mexicana Felt

Oval leaf gall on P. nigricans. Felt '12b, p. 353

Itonid. Feltomyia pisonifolia Felt

Irregular stem swellings on P. nigricans. Felt '12a, p. 174

Itonid. Feltomyia pisoniae Felt

Ranunculaceae (crowfoot family)

Thalictrum (meadow rue)

Enlarged seed pods, length 8 mm. Felt '11k, p. 547

Itonid. Meadow rue seed midge, Asphondylia thalictr Fel

Reared from same gall and probably zoophagous. Felt '11j, p. 473
Itonid. Trotteria sp.

Anemone (Anemone)

Slightly enlarged, loose bud gall on A. canadensis. Felt '15e, p. 139
Itonid. Anemone bud gall, Dasyneura anemone Felt

Golden brown erineum on the under side of the leaf of A. virginiana. Chadwick '08, p. 127
Acarid. Eriophyes sp.

Clematis (Virgins bower)

Oval stem gall, length 2 cm, diameter 1 cm. Pl. 4, fig. 1. Thompson '15, p. 82
Dipt. Agromyza sp.

Irregular, subglobular bud gall, diameter 1 cm. Pl. 9, fig. 4. Felt '08e, p. 393
Itonid. Clematis bud gall, Contarinia clematidis Felt

Irregular, subglobular bud gall, diameter 1 cm. Felt '15e, p. 147
Itonid. Dasyneura clematidis Felt

Ovate, reddish brown, axillary bud gall, diameter 4 mm. Felt '07e, p. 287
Itonid. Neolasioptera clematidis Felt

Enlarged, reddened, flower buds. Felt '07e, p. 302
Itonid. Clematis flower midge, Prodiplosis floricola Felt

Unopened, apparently normal flowers, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis clematiflorae Felt

Small, short, whitish tubes, open at the end, in crowded patches on leaves, bud stalks and buds. Chadwick '08, p. 131
Acarid. Clematis mite gall, Eriophyes sp.

Paeonia (peony)

Reared from decaying roots. Felt '11k, p. 476
Itonid. Joannisia pennsylvanica Felt

Magnoliaceae (magnolia family)

Liriodendron (tulip tree)

Globular, midrib or vein gall, monothalamous, length 5 mm.
Itonid. Tulip vein gall, Cecidomyia sp.

Midrib, irregular, polythalamous leaf gall, length 1.5 cm. Osten Sacken '62, p. 202
Itonid. Tulip midrib gall, Cecidomyia tulipiferae O.S.

Purplish blister gall on the leaf, diameter about 3 mm. Pl. 10, fig. 7. Osten Sacken '62, p. 202
Itonid. Tulip spot gall, Thecodiplosis liriodendri O.S.

Lauraceae (laurel family)

Sassafras

Reared from curling leaves of S. variifolium. Felt '06a, p. 29
Itonid. Sassafras leaf midge, Dasyneura sassafras Felt

Benzoin (spicebush)

Leaves with margins rolled.

Itonid. Cecidomyia sp.

Irregular, subcortical gall, length .5 to 2 cm. Fig. 129. Beutm. '07, p. 398

Itonid. Spicebush stem gall, Lasioptera linderae Beutm.

Papaveraceae (poppy family)

Papaver (poppy)

Reared from undescribed stem gall. Insect Life, 7:401

Itonid. Clinodiplosis caulicola Coq.

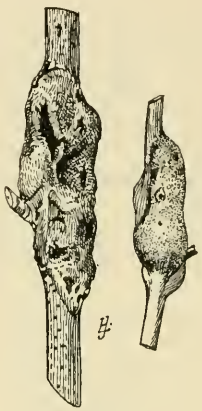

Fig. 129. Spicebush stem gall, Lasioptera linderae Beutm. (Author's illustration)

Cruciferae (mustard family)

Lepidium (peppergrass)

Swollen, discolored seed capsules. Felt '15e, p. 154

Itonid. Peppergrass seed midge, Dasyneura lepidii Felt

Sisymbrium (hedge mustard)

Irregular bud gall, diameter 8 mm.

Itonid. Dasyneura ?sisymbrii Schr.

Stanleya glauca

Swollen flower with thickened, enlarged sepals and containing many pale larvae. Cockerell '14, p. 240

Itonid. Dasyneura stanleyae Ckll.

Capparidaceae (Caper family)

Cleome serrulata (Stinking clover)

Claviform or variously enlarged seed pods. Ckll. '13, p. 279
Itonid. Cecidomyia peritomatis Ckll.

Crassulaceae

Clementsia (red orpine)

Globose, crimson-lake deformations of flower heads. Ckll., Ent. News, 25:466
Acarid. Eriophyes sp.

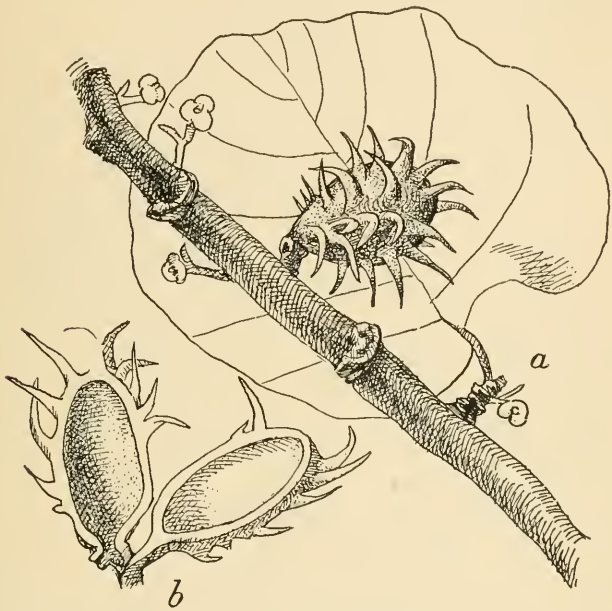

Fig. 130. Spiny witch-hazel gall, Hamamelistes spinosus Shim. (After Pergande)

Saxifragaceae (saxifrage family)

Hydrangea arborescens (wild Hydrangea)

Bud gall, length 1 cm. Felt '16d, p. 136
Itonid. Hydrangea bud gall, Asphondylia hydrangeae Felt

Ribes (currant, gooseberry)

Arrested gooseberry bud. Pl. 12, fig. 8. Felt '11i, p. 347
Itonid. Gooseberry bud midge, Rhopalomyia grossulariae Felt

Red, prematurely ripe currants. Fitch '55, p. 880
Itonid. Currant midge, Dasyneura grossulariae Fitch

Irregular, greenish or dark brown blister leaf gall, diameter 3 mm, on R. longiflorum, also on Grossularia inermis. Felt '11j, p. 468
Itonid. Currant leaf blister, Cecidomyia sp.
Gall undescribed, on R. menziesii. Felt '08e, p. 370
Itonid. Phytophaga californica Felt

Hamamelidaceae (witch-hazel family)

Hamamelis (witch-hazel)

Many-spined, green or reddish, oval bud gall, length 2 cm, diameter 1 cm. Fig. 130, Felt '06b, p. 246
Aphid. Spiny witch-hazel gall, Hamamelistes spinosus Shim.

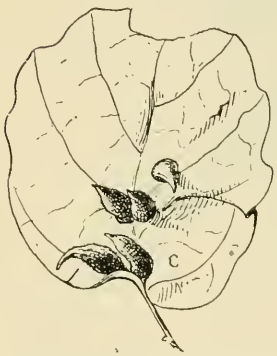

Fig. 131. Witch-hazel cone gall, Hormaphis hamamelidis Fitch. (Original)

Fig. 132. Eriophyes galls on Exochorda. (Original)

Fleshy vein folds, length 2 cm. Felt '11j, p. 461
Itonid. Cecidomyia sp.
Purplish, corrugated folds between veins. Felt '11j, p. 461
Itonid. Cecidomyia sp.
Greenish blister leaf gall, diameter 3 to 4 mm. Felt '11k, p. 481
Itonid. Asteromyia nigrina Felt
Purplish blister leaf gall, diameter 5 mm. Felt '11j, p. 461
Itonid. Cecidomyia sp.
Conical, greenish or reddish gall on the upper surface of the leaf, diameter 5 mm, length 12 mm. Fig. 131. Felt '06b, p. 246
Aphid. Witch-hazel cone gall, Hormaphis hamamelidis Fitch

Liquidambar (sweet gum)

A tawny or brown erineum on the under surface of the leaf, in the angles of the veins and close to the petiole. Chadwick '08, p. 152
Acarid. Eriophyes sp.

Platanaceae (plane tree family)

Platanus (buttonwood)

Reared from rolled leaves, probably predaceous on plant lice. Felt '08e, p. 410
Itonid. Lestodiplosis platanifolia Felt

Exochorda

Small, confluent, lobulate leaf vein swelling, diameter 1 mm, length 4 to 6 mm. Fig. 132
Acarid. Eriophyes sp.

Rosaceae (rose family)

Spiraea latifolia (meadow sweet)

Slightly enlarged, reddened flowers. Felt '07e, p. 304
Itonid. Spiraea flower midge, Itonida spiraeaflorae Felt

Reared from unopened flowers. Felt '07e, p. 302
Itonid. Prodiplosis floricola Felt

Globose axillary bud galls. Pl. 14, fig. 9
Cecid. Cecidomyia sp.

Deformed, deep-red or purplish and greenish leaf buds, length 1 cm, diameter 4 mm. Felt '11j, p. 472
Itonid. ? Asphondylia sp.

Terminal, globular, usually green bud gall, diameter 4 mm. Felt '08a, p. 388
Itonid. Lobular bud gall, Hormomyia clarkeae Felt

Terminal, oval, brown bud gall, diameter 3 mm. Felt '11k, p. 555
Itonid. Itonida spiraeina Felt

Terminal, clustered bud gall, diameter 3 mm, length 7 mm. Felt '11k, p. 553
Itonid. Clustered bud gall, Parallelodiplosis clarkei Felt

Terminal " cabbage " or " lettuce " bud gall. Felt '11k, p. 547
Itonid. Spiraea cabbage gall, Contarinia spiraeina Felt

Terminal bud gall, the leaflets fringed, diameter 3 to 4 mm. Felt '11j, p. 473
Itonid. Fringed bud gall, Cecidomyia sp.

Arrested development of flower buds. Chadwick '08, p. 148
Acarid. Eriophyes sp.

Conic leaf gall forming a pustule on the under side, diameter 4 mm, height 2 mm. Fig. 133
Itonid. Cecidomyia sp.

Yellowish brown, spotted, blister leaf gall, diameter 3 mm. Felt '09e, p. 287
Itonid. Lasioptera spiraeafolia Felt

Thickened, greenish, midrib fold, length 1 to 1.5 cm, diameter .5 cm. Pl. 12, fig. 1. Felt '15e, p. 106
Itonid. Spiraea pod gall, Rhabdophaga salicifolia Felt

Apparently reared from the same gall, probably predaceous. Felt '08e, p. 410
Itonid. Lestodiplosis spiraeafolia Felt

Marginal leaf rolls, length 3 mm. Fig. 134. Felt '09e, p. 293
Itonid. Spiraea leaf roll, Parallelodiplosis spirae Felt

Pyrus (apple, pear)

Deformed, especially globose, young pears. Felt '13m, p. 97
Itonid. Pear midge, Contarinia pyrivora Riley

Deformed young apples and rudimentary or infertile seeds. Crosby '09, p. 369
Hym. Pear seed wasp, Syntomaspis druparum Boh.

Irregular, sinuous bark elevations on the trunks and branches of pear trees
Coleop. Sinuate pear borer, Agrilus sinuatus Oliv.

Greenish or brown, blister leaf galls on both pear and apple. Parrott et al. '06, p. 291
Acarid. Pear blister mite, Eriophyes pyri Pgst.

Fig. 133. Cecidomyia sp. Gall on Spiraea. (Original)

Fig. 134. Spiraea leaf roll, Parallelodiplosis spirae Felt. (Original)

An erineum on the under side of the leaves of American crab apple. Chadwick '08, p. 141
Acarid. Eriophyes sp.

Cercocarpus parvifolius

Bud gall. Felt '13h, p. 215
Itonid. Dasyneura cercocarpi Felt

Aronia nigra (black chokeberry)

Tiny, specklike capsule leaf galls, brown when matured. Chadwick '08, p. 127
Acarid. Eriophyes sp.

Small pouch gall on under side of leaf of A. arbutifolia. Pl. 16, fig. 4. Thompson '15, p. 82
Acarid. Eriophyes sp.

Amelanchier (June berry)

Truncate leaf gall, greenish, tapering, red-lipped, length 5 mm. Fig. 135. Felt '08e, p. 388
Itonid. June berry lipped gall, Hormomyia canadensis Felt

Flattened, white, pouch gall on leaf, the margin denticulate, length 3 to 4 mm. Felt '11j, p. 453

Itonid. Toothed purse gall, Cecidomyia sp.

Oval, yellowish vein gall, length 1 to 1.5 cm. Fig. 136. Felt '11k, p. 558

Itonid. Itonida canadensis Felt

Leaf fold containing white larvae. Felt '11j, p. 453

Itonid. Cecidomyia sp.

A dimple similar to a phrygian cap with the tip rolled down on the upper side of the leaf, rarely below. Chadwick '08, p. 126

Acarid. Eriophyes sp.

Small, globose, dark brown, pocket leaf galls, singly or in clusters, on the upper surface; beneath pubescent and protuberant, diameter 2 mm, on A. rotundifolia. Chadwick '08, p. 126

Acarid. Eriophyes sp.

Fig. 135. June berry lipped gall, Hormomyia canadensis Felt. Badly infested leaf. (Original)

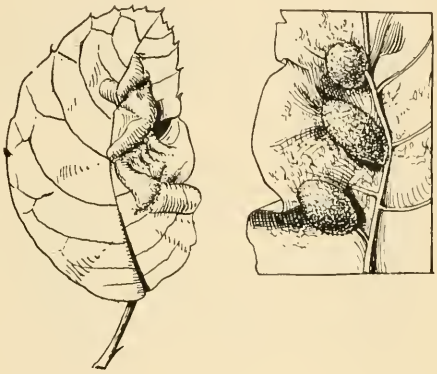

Fig. 136. Itonida canadensis Felt. Upper and lower surface, the latter enlarged. (Original)

Sorbus (mountain ash)

Rudimentary or infertile seeds. Crosby '09, p. 369

Hym. Syntomaspis druparum Boh.

Rudimentary or infertile seeds. Crosby '09, p. 375

Hym. Megastigmus brevicaudis Ratz.

Blister leaf gall. Parrott et al. '06, p. 298

Acarid. Pear blister mite, Eriophyes pyri Pgst.

Light brown or whitish erineum on the under surface of the leaf. Chadwick '08, p. 147

Acarid. Eriophyes sp.

Crataegus (White thorn)

Globose, constricted twig swellings, diameter 1.5 cm.

Coleop. Thorn limb borer, Agrilus politus Say

Irregularly oval, frequently fissured twig gall, length 3 to 4 cm, diameter 2.5 cm. Felt and Joutel '04, p. 62

Coleop. Thorn limb borer, Saperda fayi Bland.

Fig. 137. Cecidomyia sp. on Crataegus, a2727. (Original)

Irregular twig swelling, resembling black knot of plum but with bright red spores, length 1–2 cm, on C. oxycantha.

Fungus. Cedar rust, Gymnosporangium globosum

Fig. 138. Cecidomyia sp. on Crataegus, a1840. (Original)

Fig. 139. Thorn vein gall, Lobopteromyia venae Felt, typical and confluent forms. (Original)

Cockscomb leaf gall, green and red, length 1 cm. Felt '07a, p. 160

Itonid. Thorn cockscomb gall, Hormomyia crataegifolia Felt

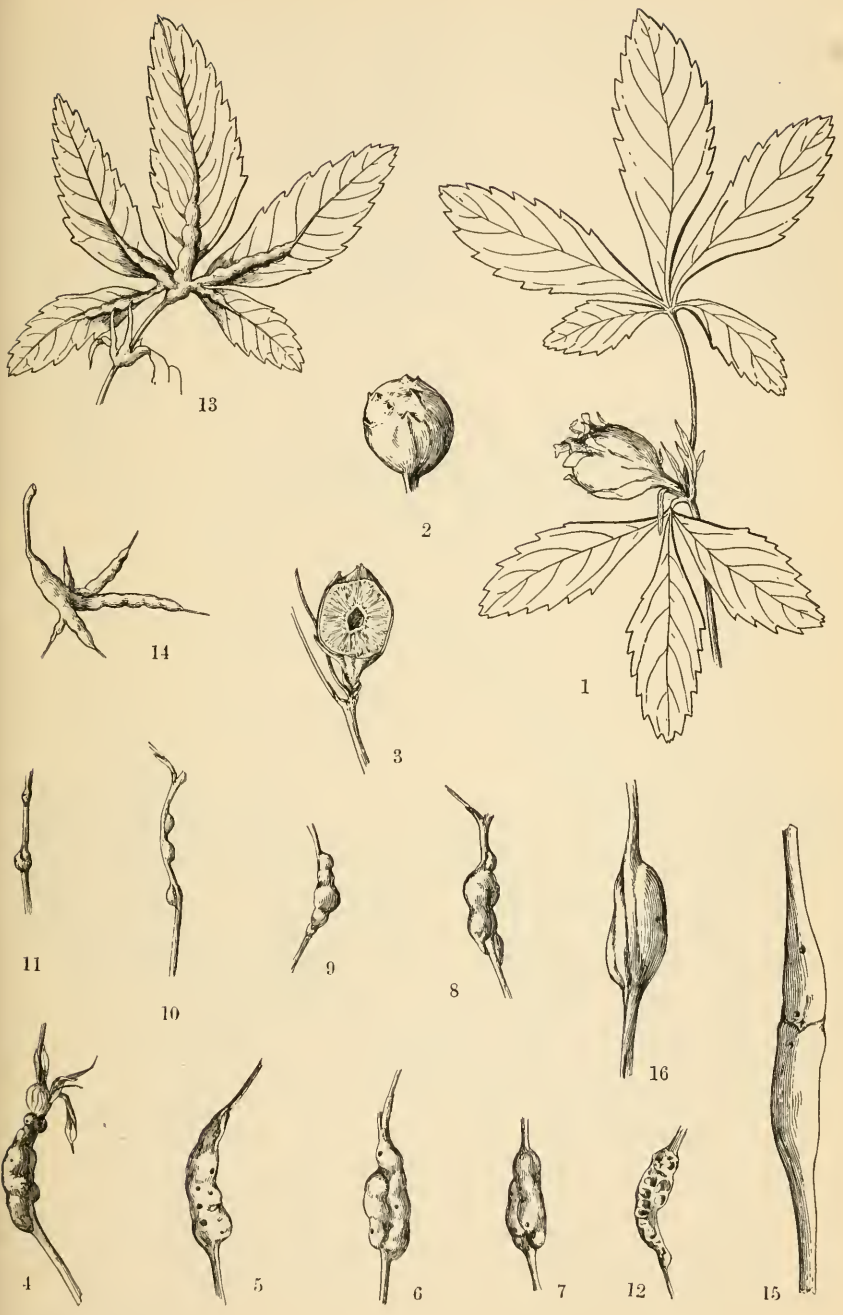

Fig. 140. 1–3. Cinquefoil axil gall, Gonaspis potentillae Bass. 4–14. Diastrophus niger Bass. 15, 16. Fusiform stem gall, D. fusiformans Ashm. (After Beutm., Am. Mus, Nat. Hist.)

Filamentous, subglobular vein gall, length 1 cm. Walsh '67, p. 266

Itonid. Tufted thorn gall. Cecidomyia bedeguar Walsh

Subglobose, greenish, sometimes confluent, frequently pointed, polythalamous vein gall, the under surface a variable brown or reddish, diameter about 3 mm. Fig. 137

Itonid. Cecidomyia sp. a2727

Fusiform, thickened vein fold gall, greenish or reddish, length 1 cm, diameter 2 mm. Fig. 138

Itonid. Cecidomyia sp. a1840

Stout, cup-shaped, fimbriate, unicellular leaf gall. Felt '08e, p. 422

Itonid. Fringed cup gall, Winnertzia hudsonici Felt

Cylindric, green, fimbriate, unicellular leaf gall, length 4 to 5 mm, height 1.5 mm. Felt '15e, p. 206

Itonid. Rhizomyia absobrina Felt

Reared from the same gall. Pl. 11, fig. 2, 3. Felt '08e, p. 408

Itonid. Lestodiplosis crataegifolia Felt

Marginal leaf roll, probably predaceous. Felt '08e, p. 409

Itonid. Lestodiplosis florida Felt

Oval, smooth, fleshy vein gall, length 5 to 8 mm. Fig. 139, pl. 10, fig. 9. Felt '14d, p. 120

Itonid. Thorn vein gall, Lobopteromyia venae Felt

Reared from the same gall. Felt '14d, p. 121

Itonid. Dicrodiplosis venitalis Felt

Purplish brown or green, blister leaf mine, diameter 8 mm. Felt '07e, p. 6

Itonid. Purple leaf blotch, Lasioptera excavata Felt

Reared from the same gall. Felt '15e, p. 208

Itonid. Rhizomyia hirta Felt

Spinulose, blackish gall on the upper surface of the leaf, on C. coccinea. Chadwick '08, p. 131

Acarid. Eriophyes sp.

Leaf curls, on C. crus-galli, C. tomentosa. Chadwick '08, p. 131

Acarid. Eriophyes sp.

Capsule gall, very small, green to brown and abundant on the leaves of C. punctata. Chadwick '08, p. 131

Acarid. Eriophyes sp.

Long, serpentine leaf folds, disposed radially, convex on the upper surface, green and red. Chadwick '08, p. 132

Acarid. Eriophyes sp.

Cotoneaster

Blister leaf galls. Parrott et al. '06, p. 298

Acarid. Pear blister mite, Eriophyes pyri Pgst.

Fragaria (strawberry)

Elongate, cylindrical, polythalamous petiole swelling, length 10 to 15 mm, diameter 3 mm. Cosens '15, p. 354

Cynipid. Cylindrical strawberry gall, Diastrophus fragariae Beutm.

Reniform petiole gall, length 8 to 21 mm. Felt '11j, p. 460

Itonid. Reniform strawberry gall, Cecidomyia reniformis Stebb.

Fig. 141. Diastrophus galls. 1. D. turgidus Bass. 2, 3. D. kincaidi Gill. 4, 5. Blackberry root gall, D. radicum Bass. (After Beutm., Am. Mus. Nat. Hist.)

Potentilla (cinquefoil)

Globose bud enlargement containing an oval larval cell, green turning brown, diameter 8 to 12 mm. Fig. 140, 1–3. Beutm. '09, p. 144

Cynipid. Cinquefoil axil gall, Gonaspis potentillae Bass.

Much enlarged, internodal part of stem, apparently monothalamous. Stebb. '10, p. 37

Itonid. Internodal stem gall, Cecidomyia potentillae-caulis Stebb.

Fig. 142. Raspberry cane girdler, Oberea bimaculata O. S. (Original)

Fig. 143. Nodular stem gall, Lasioptera nodulosa Beutm. (Author's illustration)

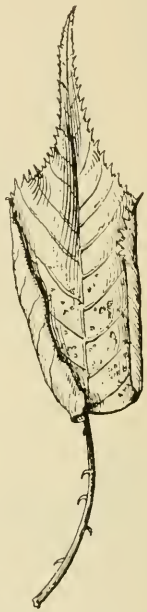

Fig. 144. Leaf roll of Camptoneuromyia rubifolia Felt. (Original)

Elongate, fusiform, polythalamous, stalk swelling, length 15 to 45 mm, diameter 5 to 8 mm. Fig. 140, 15, 16. Beutm. '09c, p. 141

Cynipid. Fusiform stem gall, Diastrophus fusiformans Ashm.

Elongate, oval, abrupt or blisterlike swellings on the stalk and midribs, monothalamous when single, polythalamous when coalescent, green turning brown, size variable, on P. canadensis. Fig. 140, 4–14. Beutm. '09c, p. 142

Cynipid. Diastrophus niger Bass.

A whitish erineum resembling minute tufts of grass, on both surfaces of the leaf. Chadwick '08, p. 138

Acarid. Eriophyes sp.

[1] Fig. 145. Diastrophus galls. 1–5. Bassett's blackberry gall, D. bassetti Beutm. 6. Smilax stem gall, D. smilacis Ashm. 7–10. Blackberry seed gall, D. cuscutaeformis O. S. (After Beut m., Am. Mus. Nat. Hist.)

Rubus (bramble)

Irregular, rounded, brown, usually clustered galls on the root stalk, diameter 5 to 25 mm, on R. canadensis. Fig. 141, 4, 5. Beutm. '09c, p. 139
Cynipid. Blackberry root gall, Diastrophus radicum Bass.

Irregular, globose, greenish or yellowish green, tinged with red or sometimes entirely red swellings of the root or the stalk close to the ground, diameter 12 to 25 mm, on R. canadensis. Fig. 145, 1–5. Beutm. '09c, p. 139
Cynipid. Bassett's blackberry gall, Diastrophus bassetti Beutm.

Variable stem swelling with a characteristic girdling a little above and below, length 2 to 3 cm, on raspberry. Fig. 142. Sling. & Crosby '14, p. 326
Coleop. Raspberry cane girdler, Oberea bimaculata Oliv.

Irregular, ridged, cane gall, length 6 mm, diameter 2 cm, on blackberry
Coleop. Gouty gall beetle, Agrilus ruficollis Fabr.

Small, clustered, ovate, spined, seedlike, green or reddish, monothalamous, cane galls, on R. villosus, R. canadensis and R. cuneifolius. Fig. 145, 7–10. Beutm. '09c, p. 140
Cynipid. Blackberry seed gall, Diastrophus cuscutaeformis O. S.

Stem gall similar to that of D. turgidus, irregular and completely filled with oval, hard larval chambers, length 25 to 60 mm, diameter 12 to 25 mm, on R. nutkanus. Fig. 141, 2, 3. Beutm. '09c, p. 138
Cynipid. Diastrophus kincaidi Gill.

Abrupt, irregularly rounded or elongate stem swellings, sometimes with four or five deep, longitudinal furrows, variable in shape, dark green, turning reddish, length 25 to 75 mm, diameter 25 to 40 mm, on R. villosus. Fig. 146, 1, 2. Beutm. '09c, p. 136
Cynipid. Blackberry knot gall, Diastrophus nebulosus O. S.

Abrupt, elongate, soft, pithy, sometimes spined, irregular, stemmed swellings, length 25 to 75 mm, diameter 15 to 30 mm, on R. strigosus. Fig. 141, 1, 146, 3–9. Beutm. '09c, p. 137
Cynipid. Diastrophus turgidus Bass.

Irregular, subcortical stem gall, length 2 cm. Fig. 143. Beutm. '07c, p. 397
Itonid. Nodular stem gall, Lasioptera nodulosa Beutm.

A subglobular, unilateral branch enlargement, diameter 5 mm, the walls thin and the cavity large, possibly North American. Marcellia 5:101
Cynipid. Rhodites rubicola Kieff.

Reared from blossoms of R. ? villosus. Felt '15e, p. 138
Itonid. Blackberry blossom midge, Dasyneura rubiflorae Felt

Warty, pruinose leaf vein gall, length 1 to 3 cm. Osten Sacken '62, p. 204
Itonid. Mealy leaf gall, Lasioptera farinosa Beutm.

Subglobular, filamentous vein gall on R. nigrobaccus. Stebb. '10, p. 35
Itonid. Mossy vein gall, Cecidomyia muscosa Stebb.

Marginal leaf roll, length 4 to 6 cm. Fig. 144. Felt '08e, p. 34
Itonid. Camptoneuromyia rubifolia Felt

Agrimonia (agrimony)

Reared from florets. Felt '07e, p. 21
Itonid. Contarina agrimoniae Felt

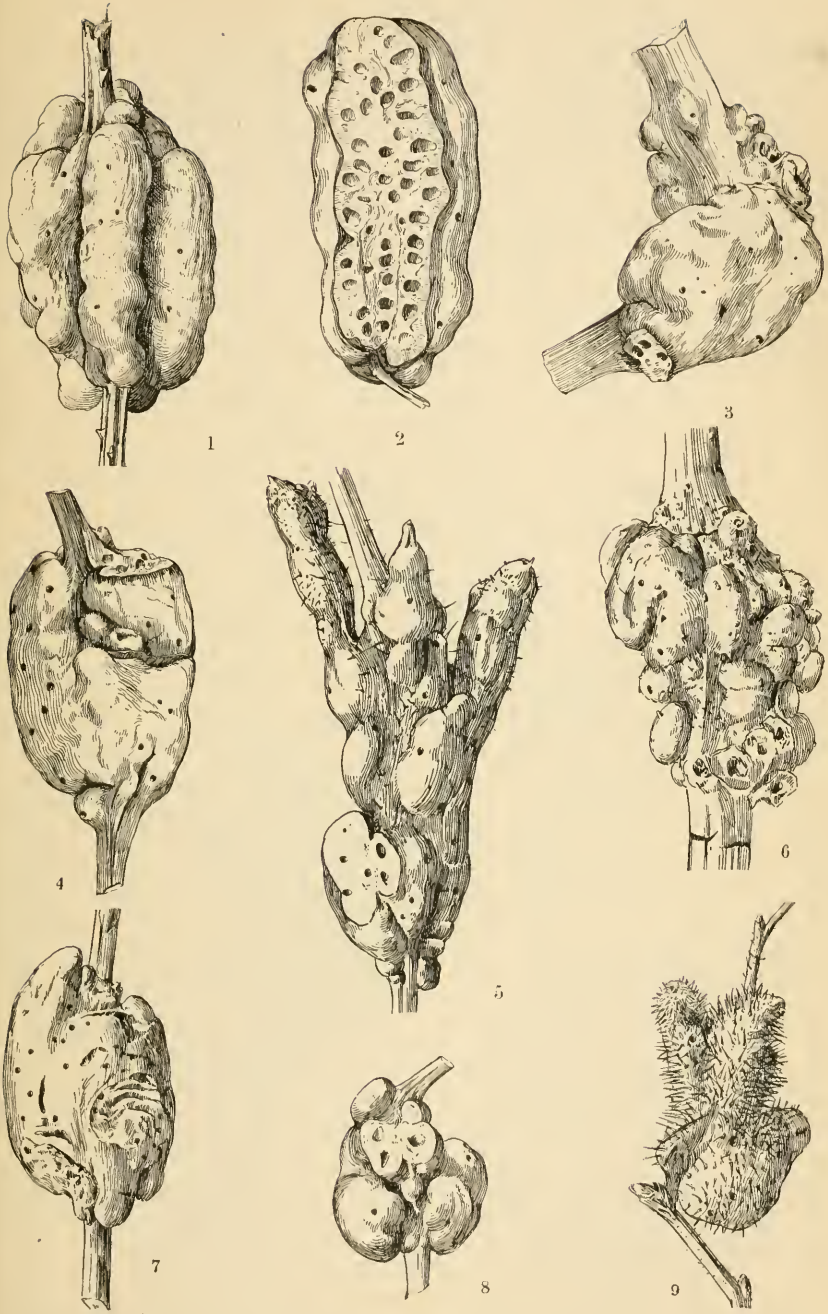

Fig. 146. Diastrophus galls. 1, 2. Blackberry knot gall, D. nebulosus O. S. 3–9. D. turgidus Bass. (After Beutm., Am. Mus. Nat. Hist.)

Rosa (rose)

Root galls

Roundish, reddish brown, variable or frequently tomato-shaped root gall, diameter 35 to 60 mm. Fig. 148, 7–8. Beutm. '07a, p. 648

Cynipid. Rose root gall, Rhodites radicum O. S.

Similar to R. radicum but with the top and sides deeply incised, giving a rosette effect. Fig. 148, 6. Beutm. '07a, p. 649

Cynipid. Rhodites utahensis Bass.

Globose, woody, root nodules, single, clustered or coalescent; diameter of nodules 4 to 6 mm, of clusters 10 to 30 mm, on sweetbrier. Fig. 150, 2–4. Beutm. '07a, p. 647

Cynipid. Rhodites fulgens Gill

Fig. 147. Spiny rose gall, Rhodites bicolor Harr. (Original)

Twig galls

Irregularly oval, filamentaceous, polythalamous twig galls composed of numerous hard cells, diameter 25 to 50 mm. Fig. 149, 5, 6. Beutm. '07a, p. 633

Cynipid. Mossy rose gall or rose bedeguar, Rhodites rosae Linn.

Masses of confluent, spherical, unilocular, spined cells or an irregular twig gall ranging in size from a walnut to an apple, differing from the preceding by the absence of mossy filaments; young galls clothed with short, erect, fine spines, later becoming smooth. Beutm. '14, p. 87

Cynipid. Rhodites mayri Schl.

Globose, irregularly rounded, polythalamous, somewhat elongated, green twig swelling covered with numerous aborted leaflets and filaments, giving it a mossy appearance; diameter 20 to 35 mm. Beutm. '14, p. 88

Cynipid. Rhodites californicus Beutm.

Fig. 148. Rose or Rhodites galls. 1–3. R. nebulosus Bass. 4. Regal rose gall, R. gracilis Ashm. 5. Rose blister gall, R. rosaefolii Ckll. 6. R. utahensis Bass. 7–8. Rose root gall, R. radicum O. S. (After Beutm., Am. Mus. Nat. Hist.)

Globular, yellowish green or reddish, prickly twig galls, diameter 5 to 15 mm, usually in clusters of 2 to 10. Fig. 147, 149, 1–4. Beutm. '07a, p. 633

Cynipid. Spiny rose gall, Rhodites bicolor Harr.

Spherical, smooth, reddish yellow, varying to pink and dull purplish twig galls, diameter 25 to 38 mm, on wild rose. Fig. 151, 8–10. Cockerell '88, p. 60

Cynipid. Rhodites tuberculator Ckll.

Globose, densely spined, reddish brown twig gall, diameter 20 to 32 mm. Fig. 150, 1, 151, 11–12. Beutm. '07a, p. 642

Cynipid. Many spined twig gall, Rhodites multispinosus Gill.

Globose, reddish, stem swellings, frequently in series, length 12 mm. Fig. 152, 1. Beutm. '07a, p. 635

Cynipid. Knotty rose gall, Rhodites vernus O. S.

Globose, elongate, soft, polythalamous enlargements, length 4 to 12 mm, diameter 4 to 9 mm. Fig. 150, 10–12. Beutm. '07a, p. 643

Cynipid. Rhodites fusiformans Ashm.

Subglobose, irregular, dense, corky twig enlargements, usually close to the stem from which the shoot arises, the surface rusty and finely wrinkled; diameter 12 to 21 mm. Fig. 151, 1–4, 13. Beutm. '07a, p. 640

Cynipid. Rhodites arefactus Gill.

Subglobose, budlike, hard, polythalamous enlargements on a short stem; diameter 15 to 25 mm. Fig. 151, 5–7. Beutm. '07a, p. 640

Cynipid. Rhodites tumidus Bass.

Rounded or reniform, smooth, green or brown, polythalamous enlargements arising abruptly from the branch; length 35 mm, diameter 10 to 22 mm. Fig. 152, 2–6. Beutm. '07a, p. 638

Cynipid. Globular rose gall, Rhodites globuloides Beutm.

Rounded or elongate, smooth, with two or more transverse ridges, polythalamous, abrupt twig swellings, length 14 to 18 mm, diameter 11 to 15 mm. Fig. 152, 7, 8. Beutm. '07a, p. 638

Cynipid. Rhodites neglectus Gill.

Subfusiform, elongate, smooth or prickly twig swellings, length 14 to 54 mm, diameter 7 to 18 mm. Fig. 152, 9–14. Beutm. '07a, p. 637

Cynipid. Long rose gall, Rhodites dichlocerus Harr.

Elongate, slight, monothalamous twig swelling, length 8 to 12 mm, diameter 2 to 4 mm. Beutm. '09f, p. 247

Cynipid. Nodular twig gall, Rhodites nodulosus Beutm.

Globose, elongate or reniform, woody twig or leaf galls covered with a white powder, diameter 4 to 15 mm. Fig. 149, 7–10. Beutm. '07a, p. 634

Cynipid. Mealy rose gall, Rhodites ignotus O. S.

Similar to the preceding, brown or reddish but without the white powder, diameter 5 to 15 mm. Fig. 150, 5–9. Beutm. '07a, p. 635

Cynipid. Rhodites variabilis Bass.

Leaf galls

Lentil-shaped, monothalamous swellings showing on both leaf surfaces, transverse diameter 2.5 to 3 mm, vertical diameter 1 to 2 mm. Fig. 148, 5, 150, 13. Beutm. '07a, p. 646

Cynipid. Rose blister gall, Rhodites rosaefolii Ckll.

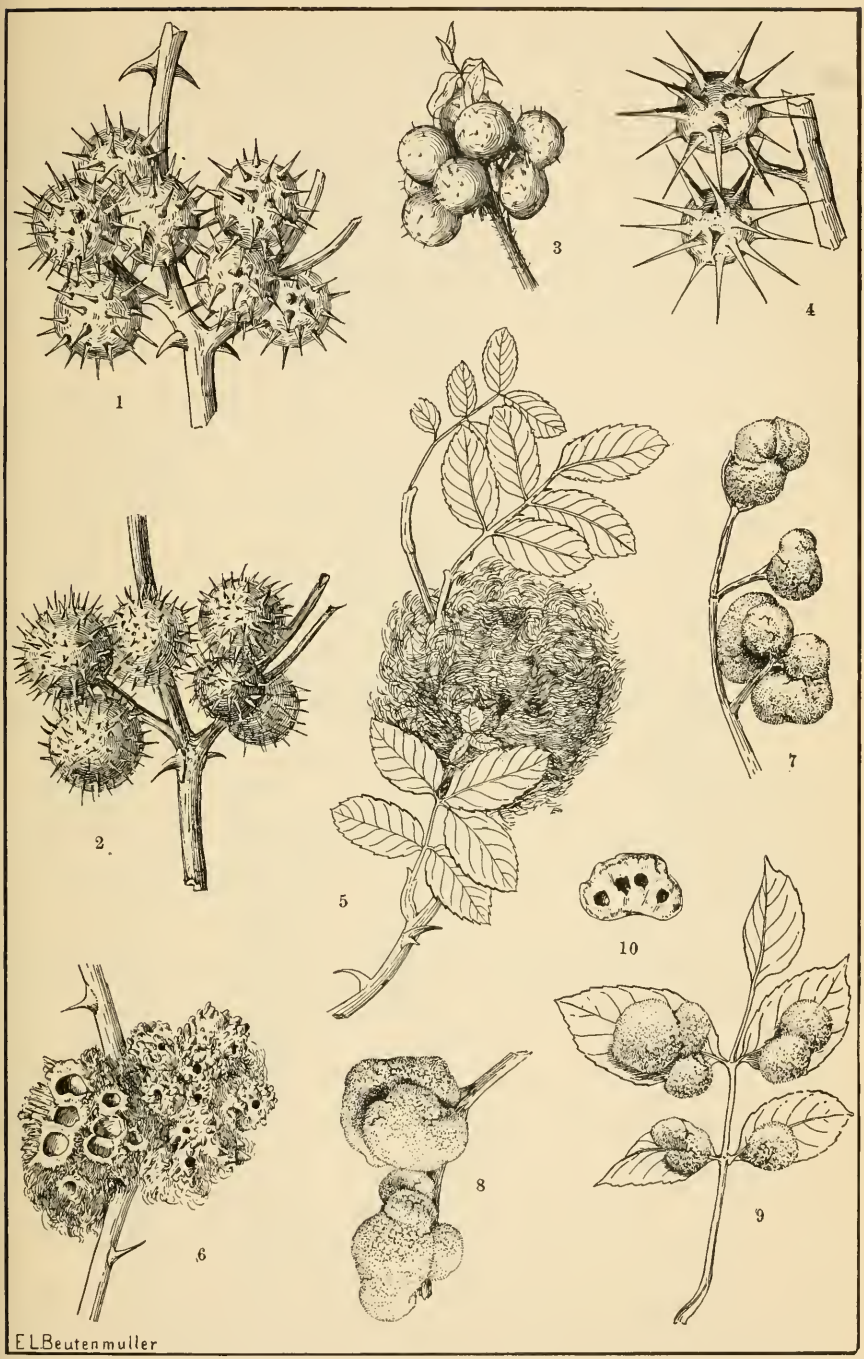

Fig. 149. Rose or Rhodites galls. 1–4. Spiny rose gall, R. bicolor Harr. 5, 6. Mossy rose gall or rose bedeguar, R. rosae Linn. 7–10. Mealy rose gall, R. ignotus O. S. (After Beutm., Am. Mus. Nat. Hist.)

Globular, hollow, weakly-spinose, small, green leaf galls, diameter 5 to 6 mm; occur singly or in clusters. Fig. 148, 1–3. Beutm. '07a, p. 644

Cynipid. Rhodites nebulosus Bass.

Gall resembling the preceding, on wild rose. Beutm. '14, p. 89

Cynipid. Rhodites pustulatoides Beutm.

Small gall, possibly identical with R. nebulosus. Beutm. '07a, p. 644

Cynipid. Rhodites politus Ashm.

Irregularly obconical leaf gall with short, obtuse processes around the edges, diameter 3 to 4 mm, on Rosa blanda. Fig. 148, 4, 153. Felt '15e, p. 48

Cynipid. Regal rose gall, Rhodites gracilis Ashm.

Leaf gall resembling a miniature simlin squash with numerous long, slender, bractlike processes, length 4 to 5 mm, diameter of top 4 mm, on wild rose. Beutm. '13a, p. 93

Cynipid. Tufted rose gall, Rhodites weldi Beutm.

Globose, monothalamous leaf galls with a subapical circle of slender, fleshy appendages 2 to 3 mm long, diameter of gall 5 mm, near R. politus. Wash. Trotter '11, p. 104

Cynipid. Rhodites sp.

Subglobose, longitudinally ribbed leaf gall, the poles broadly truncate, green or reddish, diameter 3.5 mm, near R. gracilis. Wash. Trotter '11, p. 103

Cynipid. Rhodites silvestrii Trott.

Bud galls

Rose buds and developing leaves inhabited and sometimes blasted by yellowish larvae. Felt '15e, p. 130

Itonid. Rose bud midge, Dasyneura rhodophaga Coq.

Reared from similar rose buds and undoubtedly preying on aphids. Coq. '00, p. 46

Itonid. Rose aphid midge, Aphidoletes rosivora Coq.

Curled or folded terminal leaves. Pl. 10, fig. 1. Felt '15e, p. 166

Itonid. Rose leaf midge, Dasyneura? rosarum Hardy

Apical, loose bud or rosette gall, length 2 to 2.5 cm. Fig. 154. Felt '15e, p. 97

Itonid. Rosette midge, Rhabdophaga rosacea Felt

Globose or fusiform, irregularly enlarged terminal or lateral buds with a leafy crest around and more or less concealing the acuminate apex; internally a large, irregular cavity, length 5 to 15 mm, diameter 4 to 7 mm. Wash. Trotter '11, p. 104

Cynipid. Rose bud wasp, Rhodites sp.

Reared from infertile seeds. Crosby '09, p. 377

Hym. Rose seed wasp, Megastigmus aculeatus Swed.

Amygdalus (peach)

A silver sheen on the leaf of peach. Chadwick '08, p. 127

Acarid. Phyllocoptes cornutus Bnks.

Prunus (plum, cherry)

Irregular, subcortical, black twig swelling, length 1–3 cm, on plum

Fungus. Black knot, Plowrightia morbosa

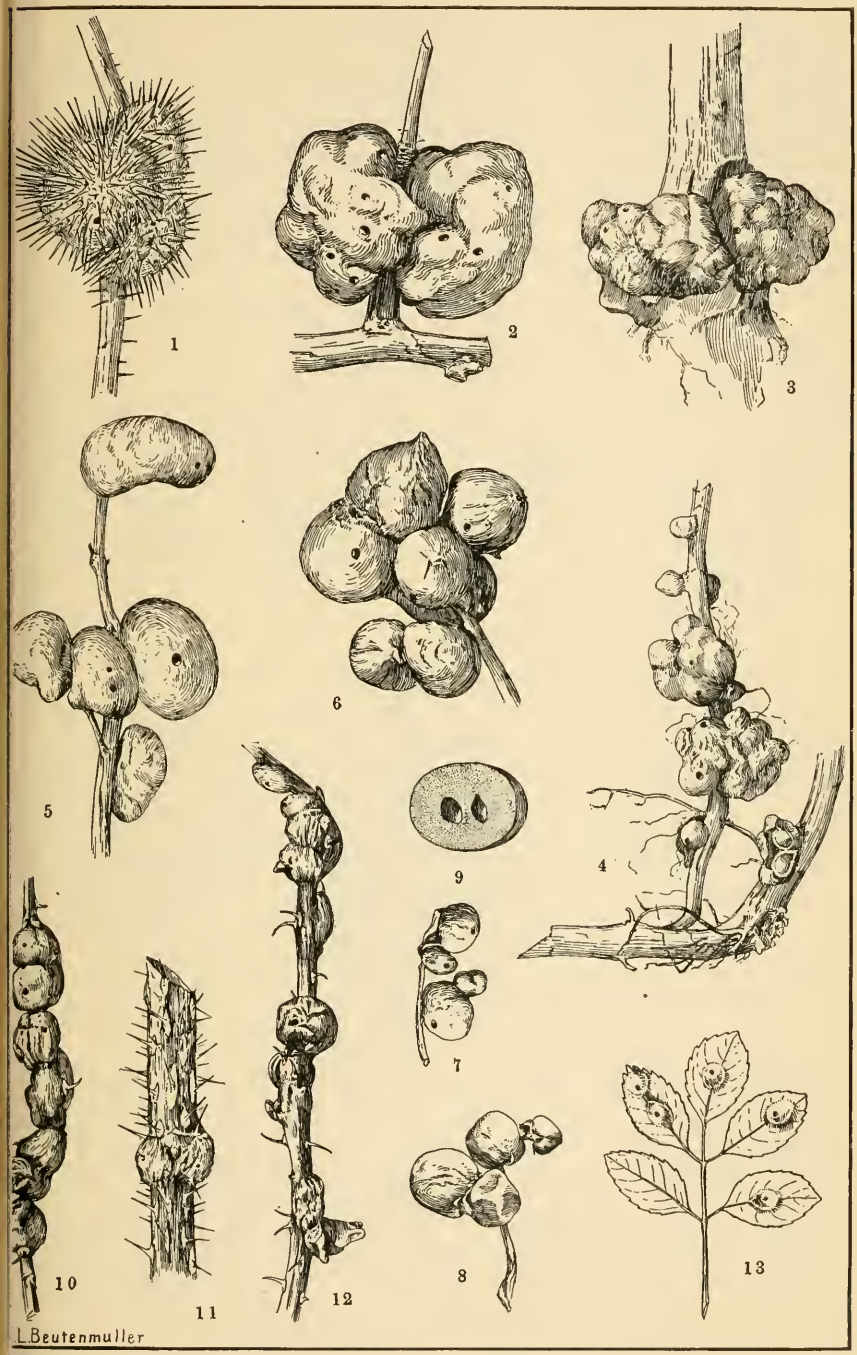

Fig. 150. Rose or Rhodites galls. 1. Many spined twig gall, R. multispinosus Gill. 2–4. R. lgens Gill. 5–9. R. variabilis Bass. 10–12. R. fusiformans Ashm. 13. Rose ster gall, R. rosaefolii Ckll. (After Beutm., Am. Mus. Nat. Hist.)

Greenish, curled, irregularly swollen pouch gall, length 5 mm, diameter 2 to 3 mm, on wild plum, P. americana Fig. 155

Acarid. Eriophyes sp. a2535

A very long, slender, green or whitish pouch gall on the under side of the leaf, on wild plum, P. americana. Chadwick '08, p. 138

Acarid. Eriophyes sp.

Pocket leaf galls, elongate and purselike, tomentose below, rounded and hairy above, on Chickasaw plum, P. angustifolia. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Tubular growth encircling the base of buds and shoots of plum, P. domestica. Chadwick '08, p. 139

Acarid. Eriophyes phloeocoptes Nal.

Long, pedunculated, black, pouch galls on the upper side of the leaf, on beach plum, P. maritima. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Smaller and shorter-stalked, green, pouch gall on the upper side of the leaves of beach plum, P. maritima. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Small, yellow, pocket galls crowded on the upper side of the leaf and around some leaf stalks of plum. Chadwick '08, p. 141

Acarid. Eriophyes sp.

Swollen, deformed fruit of chokecherry, P. virginiana. Pl. 9, fig. 6. Felt '06a, p. 130

Itonid. Chokecherry midge, Contarinia virginianiae Felt

Reared from the same fruit, probably inquiline. Felt '07a, p. 143

Itonid. Parallelodiplosis acernea Felt

Reared from the same fruit, probably inquiline. Felt '11k, p. 558

Itonid. Itonida canadensis Felt

Reared from the same fruit, probably predaceous. Felt '11j, p. 466

Itonid. Lestodiplosis sp.

Reared from the same fruit, probably inquiline. Felt '15e, p. 206

Itonid. Rhizomyia absobrina Felt

Probably reared from the same fruit, presumably inquiline. Felt '11k, p. 554

Itonid. Cecidomyia cerasiphila Felt

Reared from the same fruit, probably predaceous. Felt '07e, p. 20

Itonid. Arthrocnodax apiphila Felt

Swollen, deformed fruit, on wild cherry, P. ? melanocarpa. Felt '11k, p. 480

Itonid. Dasyneura pergandei Felt

Elliptical, polythalamous gall on the raceme axis, length 27 mm, on choke cherry, P. virginiana. Pl. 7, fig. 5. Felt '11j, p. 466

Itonid. Cecidomyia racemi Stebb.

Irregular, terminal shoot and bud gall, diameter 1.5 cm, on wild black cherry, P. serotina. Pl. 7, fig. 6. Osten Sacken '71, p. 346

Itonid. Wild cherry bud gall, Cecidomyia serotinae O. S.

Variable, oval or fusiform twig galls on wild black cherry, P. serotina. Felt '08e, p. 407

Itonid. Cecidomyia sp.

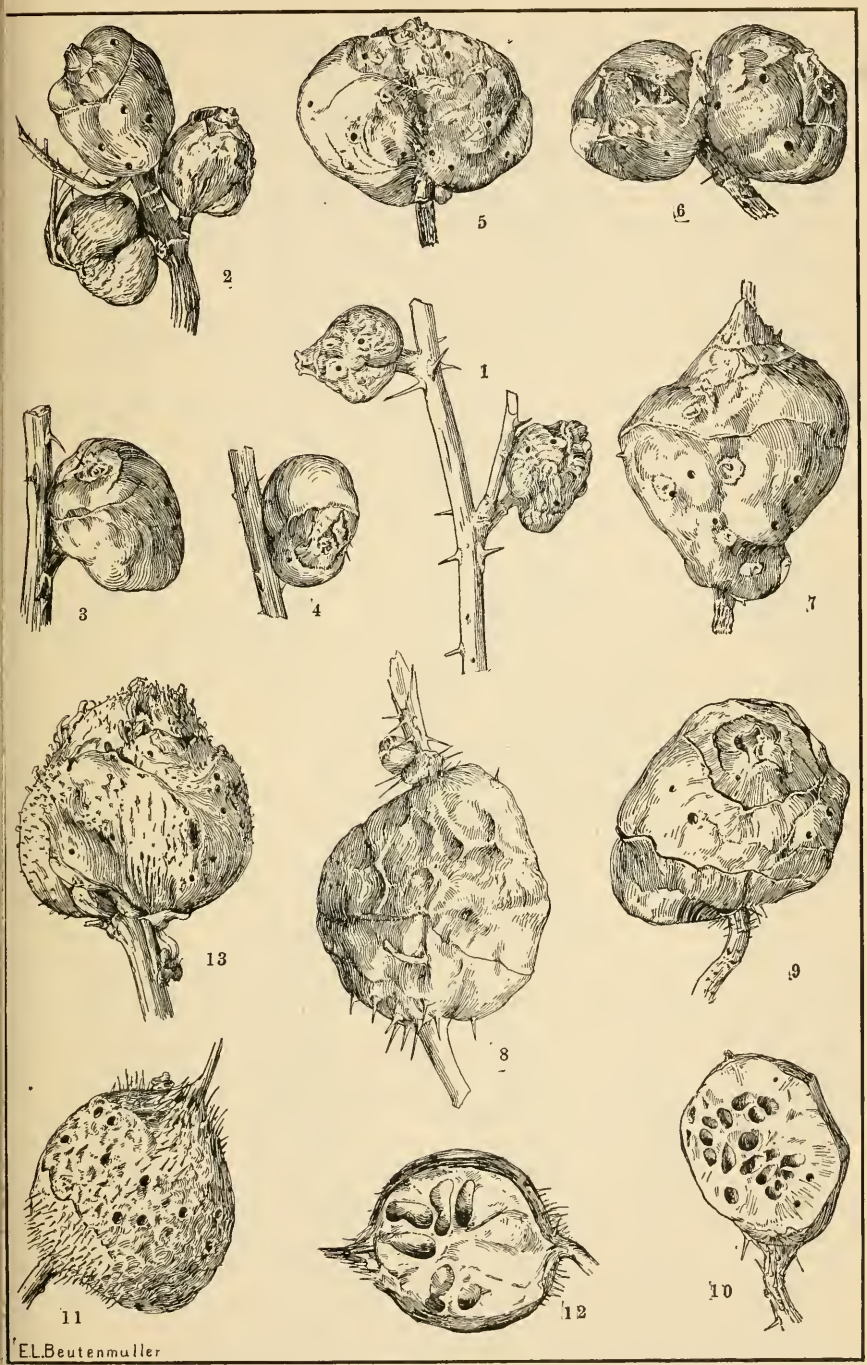

Fig. 151. Rose or Rhodites galls. 1–4, 13. R. arefactus Gill. 5–7. R. tumidus Bass 8–10. R. tuberculator Ckll. 11–12. Many spined twig gall, R. multispinosus Gill (After Beutm., Am. Mus. Nat. Hist.)

Conical swelling at base of leaf stalk, length 1.5 cm, diameter 8 mm. Felt '15e, p. 219

Itonid. Cecidomyia sp.

Reared from same gall, probably predaceous. Felt '11j, p. 466

Itonid. Lestodiplosis cerasi Felt

Irregular, thickened, folded, nearly full-sized choke cherry leaf, P. virginiana. Pl. 11, fig. 4. Felt '07e, p. 21

Itonid. Mycodiplosis cerasifolia Felt

Stemmed, fusiform, green or red leaf galls on upper surface, length 1 cm, diameter 4 to 5 mm, on wild black cherry, P. serotina. Fig. 156, 157, pl. 16, fig. 2. Beutm. '04, p. 38

Acarid. Wild cherry pouch gall, Eriophyes padi Nal.

Pocket gall, shorter and more densely crowded than the preceding, on wild black cherry, P. serotina. Chadwick '08, p. 140

Acarid. Eriophyes sp.

Greenish or reddish pouch gall on the upper surface of the leaf of choke cherry P. virginiana. Chadwick '08, p. 140

Acarid. Eriophyes sp.

Reddish, slender, pouch galls, somewhat irregular and pubescent, on pin cherry leaves, P. pennsylvanica. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Adenostoma

Reared from apparently unmodified seeds. Felt '16f, p. 177

Itonid. Asphondylia adenostoma Felt

Leguminosae (pulse family)

Prosopsis (mesquite)

Aborted fruit. Ckll. '98, p. 329. Felt '16d, p. 149

Itonid. Asphondylia prosopidis Ckll.

Fusiform bud gall. Felt '11j, p. 466

Itonid. Cecidomyia sp.

Gleditsia (honey locust)

Twig gall undescribed. Felt '11j, p. 461

Itonid. Neolasioptera sp.

Orange larvae in folded leaflets. Pl. 9, fig. 8. Felt '15e, p. 163

Itonid. Honey locust pod gall, Dasyneura gleditschiae O. S.

Cassia (wild sensitive plant)

Irregular stem gall, length 3 cm, diameter 5 or 6 mm. Felt '09e, p. 287

Itonid. Lasioptera cassiae Felt

Thermopsis montana

Folded, thickened, terminal leaf pods

Itonid. Cecidomyia sp.

Crotalaria (rattle box)

Fusiform stem swelling. Felt '11j, p. 459

Itonid. Cecidomyia crotalariae Stebb.

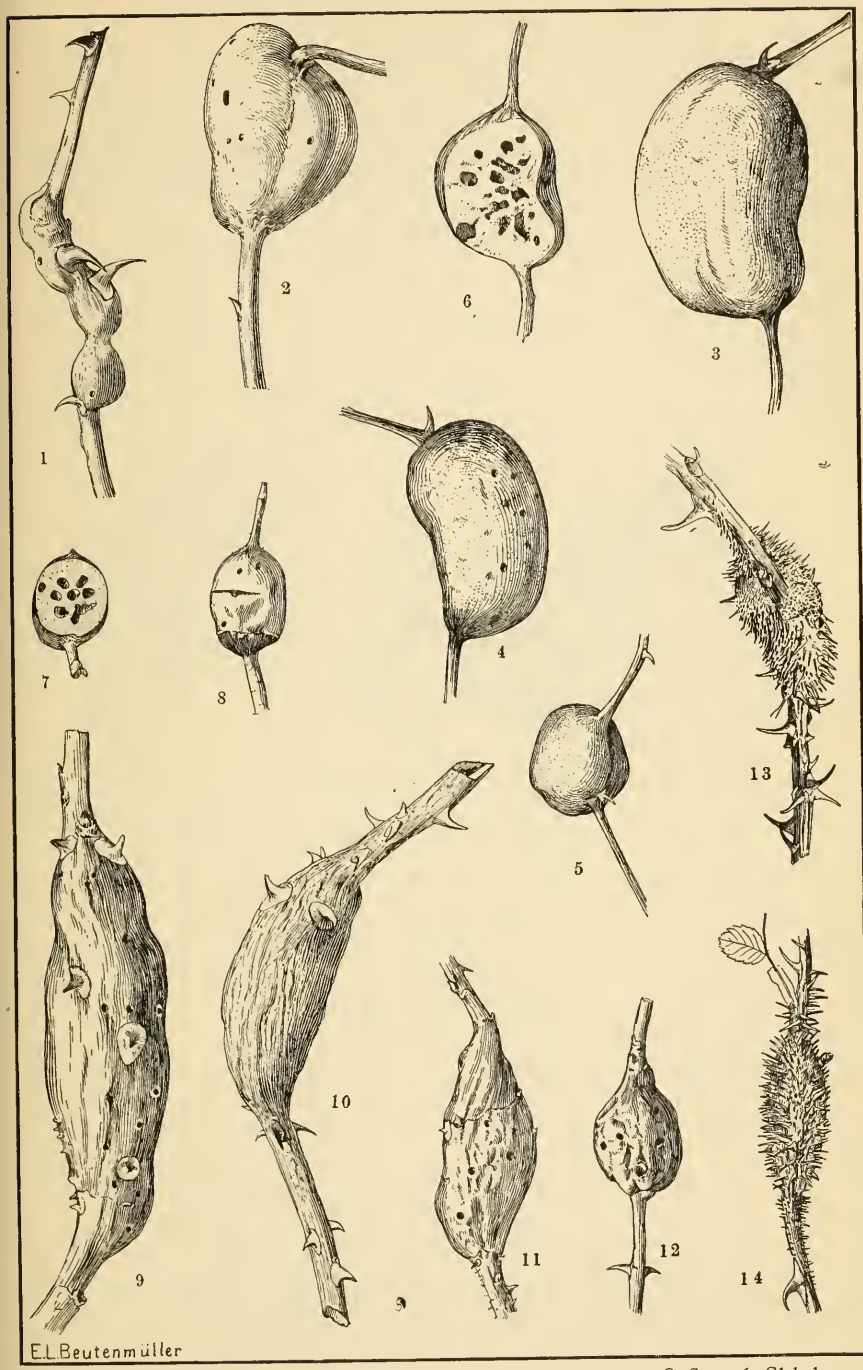

Fig. 152. Rose or Rhodites galls. 1. Knotty rose gall, R. vernus O. S. 2–6. Globular rose gall, R. globuloides Beutm. 7, 8. R. neglectus Gill. 9–14. Long rose gall, R. dichlocerus Harr.; 9–12. smooth; 13, 14. spiny types. (After Beutm., Am. Mus. Nat. Hist.)

Genista (woad-waxen)

Folded apical leaflets. Felt '11j, p. 461
Itonid. ? Dasyneura genistamtorquens Kieff.

Lupinus (lupine)

Irregularly fusiform stem galls, light green when fresh, fleshy, firm, polythalamous, the interior fibrous; length 1.5 to 2.5 cm, diameter 1 to 1.5 cm, on L. propinquus. Fig. 158. Felt '16g, p. 413
Itonid. Dasyneura lupini Felt

Elongate stem swelling
Itonid. Cecidomyia sp.

Reared from undescribed gall. Felt '08e, p. 326
Itonid. Lasioptera lupini Felt

Folded leaflets. Felt '15e, p. 143
Itonid. Clover leaf midge, Dasyneura trifolii Loew

Fig. 153. Regal rose gall, Rhodites gracilis Ashm. (Author's illustration)

Fig. 154. Rosette midge, Rhabdophaga rosacea Felt. (Original)

Trifolium (clover)

Yellowish larvae in the flower heads of red clover, P. pratense. Felt '15e, p. 172
Itonid. Clover seed midge, Dasyneura leguminicola Lint.

Folded, variably discolored with reddish and yellowish, white clover leaves, T. repens. Felt '15e, p. 143
Itonid. Clover leaf midge, Dasyneura trifolii Loew

Medicago (alfalfa)

Aborted seed pods. Felt '11j, p. 463
Itonid. Asphondylia websteri Felt

Reared from seeds, probably predaceous upon Asphondylia
Itonid. Lestodiplosis sp. a2705

Robinia (locust)

Irregular, fusiform twig swellings, diameter 7 to 8 mm, length 2 mm. Pl. 4, fig. 7. Felt '06b, p. 478

Lepid. Locust twig gall, Ecdytolopha insiticiana Zell.

Folded, young leaflets. Felt '15e, p. 163

Itonid. Locust midge, Dasyneura pseudacaciae Fitch

Rolled leaf margins. Felt '08e, p. 410

Itonid. Obolodiplosis robiniae Hald.

Desmodium (tick trefoil)

Bud gall, probably loose. Beutm. '07d, p. 306

Itonid. Hyperdiplosis meibomiifoliae Beutm.

Elongate, fusiform, clustered bud gall, length 8 to 22 mm. Beutm. '07c, p. 390

Itonid. Dasyneura meibomiae Beutm.

Irregular stem gall, length 1.8 cm. Fig. 159. Felt '07a, p. 106

Itonid. Lasioptera desmodii Felt

Fig. 155. Eriophyes gall on wild plum, a2535. (Original)

Fig. 156. Wild cherry pouch gall, Eriophyes padi Nal. A rather thick infestation. (Original)

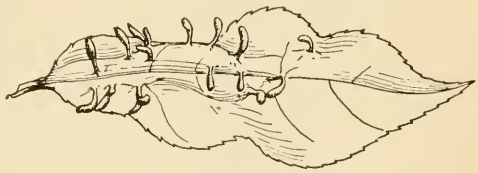

Fig. 157. Wild cherry pouch gall, Eriophyes padi Nal. A scattering infestation. (Original)

Polythalamous stem gall, length 2 cm. Fig. 160. Felt '07a, p. 155

Itonid. Neolasioptera hamata Felt

Lespedeza (bush clover)

Stem gall, length 5 mm, diameter 3 mm. Felt '11j, p. 463

Itonid. Cecidomyia sp.

Lathyrus maritimus (beach pea)

Rolled leaflets, length 1 to 2 cm. Felt '15e, p. 149

Itonid. Dasyneura maritima Felt

Amphicarpa (hog peanut)

Oval stem gall, length 1.5 cm, diameter 1 cm. Felt '11j, p. 453

Itonid. Lasioptera sp.

Geraniaceae (geranium family)

Geranium (Crane's-bill)

Colorless larvae on a blister enlargement, apparently fungivorous. Felt '11j, p. 461

Itonid. Cecidomyia sp.

Irregular, hairy, pinkish, pouch leaf gall, diameter 3 to 4 mm, on G. richardsonii. Fig. 161

Acarid. Eriophyes sp. a2529

Fig. 158. Dasyneura lupini Felt. (Original)

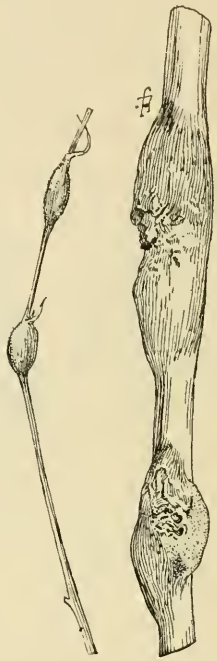

Fig. 159. Lasioptera desmodii Felt, two types of gall. (Author's illustration)

Zygophyllaceae (Caltrop family)

Covillea tridentata (creosote bush)

Gall undescribed. Felt '16d, p. 118

Itonid. Asphondylia auripila Felt

Globose, polythalamous, woody gall bearing a dense cluster of thin, linear filaments, diameter of gall 1 to 2 cm. Ariz. Fig. 162. Trotter '11, p. 132

Itonid. Asphondylia ?auripila Felt

Rutaceae (Rue family)

Citrus (orange, lemon)

Irregularly lobulate, woody bud galls on navel orange, length 1.5 cm, diameter 1 cm

Acarid. Eriophyes sp. a2856

Brownish, rust spots on the orange and curled leaves, lacking gloss, C. aurantium. Chadwick '08, p. 130

Acarid. Phyllocoptes oleivorus Ashm.

Whitened or silvery spots on the lemon rind and curled lemon leaf. Chadwick '08, p. 131

Acarid. Phyllocoptes oleivorus Ashm.

Fig. 160. Neolasioptera hamata Felt. (Original)

Fig. 161. Eriophyes on Geranium richardsonii. (Original)

Euphorbiaceae (spurge family)

Manihot (cassava)

Leaf galls. Felt '10c, p. 268

Itonid. Itonida manihot Felt

Leaf galls. Felt '12c, p. 144

Itonid. Lasiopteryx manihot Felt

Acalypha (three-seeded mercury)

Subglobular, reddish brown bud gall, diameter 4 mm. Felt '11j, p. 452

Itonid. Cecidomyia sp.

Phyllanthus distichus (Otaheite gooseberry)

Reared from fruit. Felt '16d, p. 123

Itonid. Asphondylia siccae Felt

Euphorbia (spurge)

Cylindrical fruit gall, length 5 mm, diameter 1 mm. Felt '11j, p. 460

Itonid. Spurge fruit gall, Cecidomyia sp.

A deformation of the leaves and flower buds of E. corollata. Chadwick '08, p. 132

Acarid. Eriophyes sp

Fig. 162. Asphondylia ?auripila. Gall on creosote bush. (Original)

Fig. 163. Box leaf midge, Monarthropalpus buxi Lab. (Author's illustration)

Buxaceae (box family)

Buxus (box)

Oval, yellowish or brownish blister leaf galls, diameter 2 to 4 mm. Fig. 163. Felt '11j, p. 455

Itonid. Box leaf midge, Monarthropalpus buxi Lab.

Anacardiaceae (cashew family)

Mangifera (mango)

Reared from subcortical gall. Felt '09n, p. 299

Itonid. Mango bark midge, Asynapta mangiferae Felt

Reared from blister leaf gall. Felt '11g, p. 49

Itonid. Mango blister midge, Erosomyia mangiferae Felt

Rhus (sumac)

Subcortical stem gall. Felt '11j, p. 468

Itonid. Cecidomyia sp.

Reared from dead twigs. Felt '14b, p. 113

Itonid. Parallelodiplosis cinctipes Felt

Globose root galls on poison dogwood. Felt '15e, p. 146

Itonid. Sumac root gall, Dasyneura rhois Coq.

Infertile seeds. Crosby '09, p. 385

Hym. Eurytoma rhois Crosby

Stunted heads or curled leaves. Fig. 164, pl. 16, fig. 7. Felt '08e, p. 404

Acarid. Eriophyes sp.

Fig. 164. Sumac leaves deformed by Eriophyes from which Arthrocnodax rhoina Felt was reared. (Original)

Fig. 165. Sumac bud gall, Asphondylia integrifoliae Felt. (Original)

Probably preying on a plant mite.

Itonid. Arthrocnodax rhoina Felt

Subglobular flower bud gall, diameter 3 mm. Fig. 165. Felt '16d, p. 126

Itonid. Sumac bud gall, Asphondylia integrifoliae Felt

An erineum on the leaves of R. radicans. Chadwick '08, p. 144

Acarid. Eriophyes sp.

Irregular, rounded, green to red or purple dimple galls, usually in granular heaps, on R. radicans. Pl. 16, fig. 6. Chadwick '08, p. 144

Acarid. Eriophyes sp.

Irregular, purplish, pouch or cylindric leaf galls with a diameter of 1 mm, the orifice with a white pubescence, on R. trilobata, Utah

Acarid. Eriophyes sp. a2760

Somewhat pear-shaped or round, reddish leaf galls occur in September, length 18 to 36 mm. Felt '06b, p. 647

Aphid. Red pouch gall, Pemphigus rhois Fitch

Aquifoliaceae (holly family)

Nemopanthus (mountain holly)

Oval bud gall, length 5 mm. Felt '16d, p. 142

Itonid. Asphondylia ilicoides Felt

Celastraceae (staff tree family)

Pachistima myrsinitis

Terminal leaves, folded, dark red. Felt '11j, p. 464

Itonid. Cecidomyia sp.

Fig. 166. Gouty vein midge, Dasyneura communis Felt. Gall on red maple. (Original)

Fig. 167. Bladder maple gall, ? Phyllocoptes ? quadripes Shim., on red maple, showing lower and upper surface and one gall enlarged. (Original)

Celastrus (climbing bittersweet)

Irregular, subcortical gall on the root, length 2.5 cm, diameter 1 cm. Stebb. '10, p. 41

Itonid. Cecidomyia celastri Stebb.

Irregular, subcortical stem gall, probably identical with the preceding. Felt '11j, p. 457

Itonid. Cecidomyia sp.

Aceraceae (maple family)

Acer rubrum (red maple)

Whitish larvae under decaying bark. Felt '13h, p. 213

Itonid. Winnertzia aceris Felt

Same as above. Felt '13m, p. 205

Itonid. Miastor americana Felt

Same as above, predaceous. Felt '13h, p. 213

Itonid. Lestodiplosis sp.

Irregular twig swellings resembling those on willow and poplar made by Saperda concolor

Coleopt. Maple twig gall, Xylotrechus aceris Fisher

Irregular, oval, roughened branch swellings, length 10 to 15 cm, diameter 6 to 10 cm. Felt '06b, p. 56

Lepid. Maple sesian, Sesia acerni Clem.

Pustular areas in the smooth bark of red maple. Hodgk. '13, p. 420

Acarid. Anthocoptes transitionalis Hodgk.

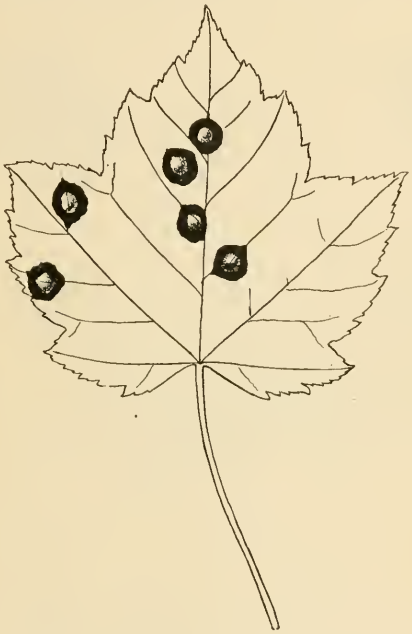

Fig. 168. Maple leaf spot, Cecidomyia ocellaris O. S. (Original)

Pouch vein galls, greenish or reddish, length 6 mm. Fig. 166. Felt '11, p. 478

Itonid. Gouty vein gall, Dasyneura communis Felt

Small bladder like leaf galls, diameter 2.5 mm. Fig. 167, Chadwick '08, p. 120

Acarid. Maple bladder gall, ? Phyllocoptes quadripes Shim.

Ocellate, yellow, red-margined blister leaf gall, diameter 3 to 4 mm. Fig. 168. Osten Sacken '62, p. 199

Itonid. Maple leaf spot, Cecidomyia ocellaris O. S.

Irregular leaf folds. Felt '15e, p. 94

Itonid. Rhabdophaga rileyana Felt

Distorted, rolled leaves bearing cocoons, possibly identical with the preceding. Felt '11j, p. 452

Itonid. Dasyneura sp

Reared from similar leaves, predaceous. Felt '11j, p. 452
Itonid. Lestodiplosis sp.

Slender, fusiform leaf galls, length 5 mm. Felt '06b, p. 650
Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

Red erineum on the upper leaf surface. Hodgk. '13, p. 423
Acarid. Phyllocoptes minutissimus Hodgk.

Pinkish erineum on the under leaf surface. Hodgk. '13, p. 421, 422, 424
Acarid. Eriophyes major Hodgk.
Eriophyes ornatus Hodgk.
Phyllocoptes quinquilobus Hodgk.

Fig. 169. Maple bladder gall, Phyllocoptes quadripes Shim., on soft maple. Several galls greatly enlarged. (Original)

Yellowish to deep brown erineum in large patches on under side of leaf. Chadwick '08, p. 120
Acarid. Eriophyes sp.

A whitish or brown erineum in elongated patches on the veins, on the upper side of the leaf. Chadwick '08, p. 120
Acarid. Eriophyes sp.

A whitish, frostlike erineum with small spots of rosy pink spreading broadly along the main veins, on the upper surface. Chadwick '08, p. 120
Acarid. Eriophyes sp.

Acer saccharinum (white or silver maple)

Free larvae on irregularly curved leaves. Felt '15e, p. 93
Itonid. Maple leaf midge, Rhabdophaga aceris Shim.

Slender, fusiform leaf galls, length 5 mm, sometimes very abundant, on the upper surface, also on sugar maple and white-barked maple. Felt '06b, p. 630

Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

Small, bladderlike greenish or reddish leaf galls, diameter 2.5 mm, very abundant, on the upper surface. Fig. 169, pl. 16, fig. 9. Felt '06b, p. 630

Acarid. Maple bladder gall, Phyllocoptes quadripes Shim.

Associated with the preceding. Hodgk. '13, p. 421

Acarid. Eriophyes confusus Hodgk.

A pale yellow to deep brown erineum on the under side of the leaf. Chadwick '08, p. 121

Acarid. Eriophyes sp.

Acer saccharum (sugar or rock maple)

Thickened vein galls, green to brownish, length 3 to 5 mm. Fig. 170. Felt '15e, p. 181

Itonid. ? Dasyneura communis Felt

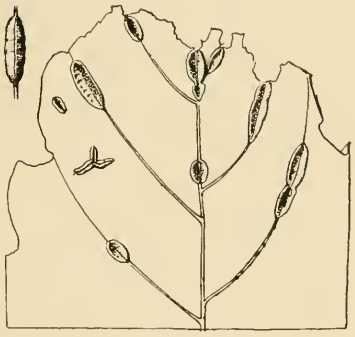

Fig. 170. Gouty vein midge, Dasyneura communis Felt. Gall presumably of this species on sugar maple, one gall closed, the others open. (Original.)

Slender, fusiform leaf galls, length 5 mm, sometimes very abundant, on the upper surface, also on soft maple and white-barked maple. Felt '06b, p. 630

Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

Red erineum on the upper leaf surface. Hodgk. '13, p. 421, 422, 423 and 424

Acarid. Eriophyes elongatus Hodgk.
Eriophyes maculatus Hodgk.
Eriophyes regulus Hodgk.
Phyllocoptes constrictus Hodgk.
Phyllocoptes variabilis Hodgk.

Greenish erineum on the under leaf surface. Hodgk. '13, p. 421

Acarid. Eriophyes modestus Hodgk.

A white or whitish erineum in patches on the under side of the leaf. Chadwick '08, p. 121

Acarid. Eriophyes sp.

A rusty or brown erineum on the under leaf surface, forming patches along the veins. Chadwick '08, p. 122

Acarid. Eriophyes sp.

Acer platanoides (Norway maple)

Epidermal, hairy growths in vein axils, on the under leaf surface. Hodgk. '13, p. 423

Acarid. Phyllocoptes magnificus Hodgk.

Acer leucoderme (white-barked maple)

Slender, fusiform leaf galls, length 5 mm, sometimes very abundant on the upper surface, also on sugar maple and soft maple. Felt '06b, p. 630

Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

An erineum in scattered patches, mostly on the under surface of the leaf and slightly dimpled. Chadwick '08, p. 152

Acarid. Eriophyes sp.

Acer spicatum (mountain maple)

Whitish erineum on the upper leaf surface. Hodgk. '13, p. 422

Acarid. Eriophyes parallelus Hodgk.

Acer glabrum (dwarf maple)

A purple erineum in large patches at the tips of the lobes and on the upper side of the leaf, sometimes sprinkled over the under side. Chadwick '08, p. 119

Acarid. Eriophyes sp.

Acer species (maple)

Rolled leaf margin, the edges yellow, the center crimson. Felt '11j, p. 452

Itonid. Cecidomyia sp.

A black, velvety erineum in large, irregular patches on the leaf. Chadwick '08, p. 123

Acarid. Eriophyes sp.

Acer negundo (box elder)

Terminal bud galls with a diameter of 1 to 2 cm or greatly swollen, deformed leaflets, the thickened midrib forming a mass 3 cm long and 7 mm in diameter, the blade being almost aborted. Gill. '90a, p. 392

Acarid. Box elder bud gall, Cecidomyia negundinis Gill.

Variable, subglobose leaf gall, diameter about 2 mm. Felt '08e, p. 394

Itonid. Box elder leaf gall, Contarinia negundifolia Felt

A white erineum or shallow dimple on the under side of the leaf, sometimes involving entire leaves of young or basal shoots. Chadwick '08, p. 119

Acarid. Eriophyes sp.

Warty swellings on the leaves. Hodgk. '13, p. 422, 424
Acarid. Eriophyes negundi Hodgk.
Phyllocoptes splendidus Hodgk

Balsaminaceae (touch-me-not family)

Impatiens (balsam, jewel weed)

Globose, flower bud gall, length 1 cm. Pl. 7, fig. 4. Osten Sacken '62, p. 204
Itonid. Touch-me-not gall, Cecidomyia impatientis O. S.
Tumid, midrib fold, length 5 mm. Pl. 10, fig. 8. Felt '07a, p. 105
Itonid. Lasioptera impatientifolia Felt
Subglobular stem gall. Beutm. '08, p. 75
Itonid. Lasioptera fulva Beutm.
Enlarged stem infested with Æcidium impatientis. Felt '08e, p. 401
Itonid. Mycodiplosis impatientis Felt

Rhamnaceae (buckthorn family)

Ceanothus (red root)

Loose, terminal bud gall, length 2 cm, diameter 1.5 cm. Felt '16d, p. 135
Itonid. Redroot bud gall, Asphondylia ceanothi Felt
Thickened vein fold, sometimes confluent, light green, 5x3 mm
Itonid. Cecidomyia sp. a2818
Spindle-shaped stem enlargements, 10 to 15 mm long, 5 to 8 mm in diameter, sometimes on branches, occasionally aborting flower clusters.
Lepid. Red root stem gall, Stagmatophora ceanothiella Cosens

Vitaceae (vine family)

Psedera (Virginia creeper, woodbine)

Infertile seeds. Crosby '09, p. 382
Hym. Woodbine seed wasp, Prodecatoma phytophaga Crosby
Tumid, more or less irregular, sometimes winged midrib leaf gall, length 1 cm. Fig. 171. Felt '13h, p. 216
Itonid. Woodbine vein gall, Dasyneura parthenocissi Stebb.
A " nail gall " or pouch leaf gall tapering at both extremities. Chadwick '08, p. 127
Acarid. Eriophyes sp.
Irregular root gall, diameter 2 to 3 mm. Felt '11j, p. 466
Itonid. Woodbine root gall, Cecidomyia sp.

Vitis (grape)

Fruit and bud galls

Shriveled berries and enlarged seeds. Crosby '09, p. 380
Hym. Grape seed wasp, Evoxysoma vitis Saund.
Reared from grape seeds. Howard '95, p. 23
Hym. Decatomidea cooki How.
Reared from enlarged, sometimes reddish, striped blossom buds, diameter 2 to 3 mm. Felt '09f, p. 15
Itonid. Grape blossom midge, Contarinia johnsoni Sling.

Hard, nut-like, polythalamous bud gall, diameter 1.5 cm. Felt '16d, p. 109
Itonid. Grape apple gall, Schizomyia pomum Walsh & Riley
Possibly reared from the same gall. Felt '15e, p. 108
Itonid. Rhabdophaga hirticornis Felt

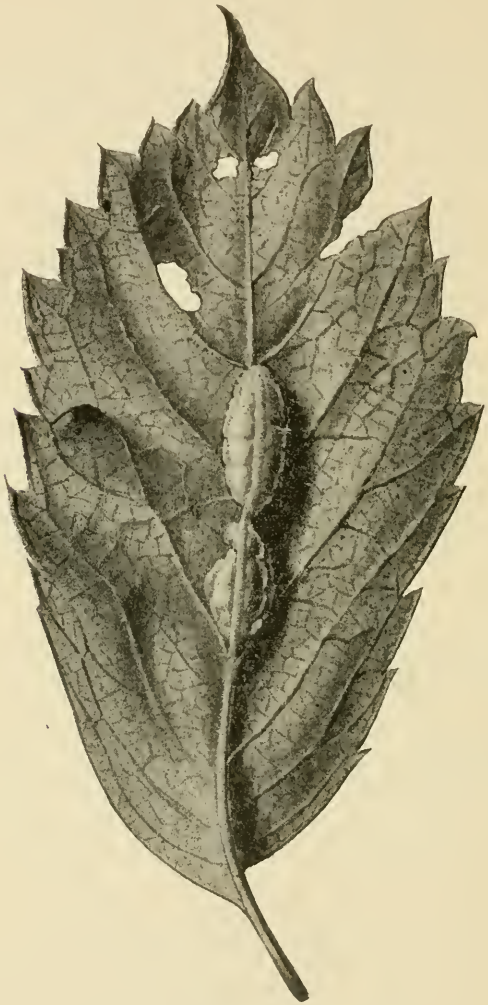

Fig. 171. Woodbine vein gall, Dasyneura parthenocissi Stebb. (Author's illustrati

Clustered, fusiform, woolly, pubescent bud galls, each 1 to 1.5 cm long. Pl. 13, fig. 6. Felt '16d, p. 107
Itonid. Grape filbert gall, Schizomyia coryloides Walsh & Riley

Leaf or tendril galls

Oval, petiole or tendril gall, length 2.5 cm, swelling mostly distant from the base. Felt, '16d, p. 113

Itonid. Schizomyia petiolicola Felt

Reared from similar gall. Fig. 172. Felt '08e, p. 328

Itonid. Asteromyia petiolicola Felt

Reared from similar gall. Felt '09e, p. 287

Itonid. Lasioptera riparia Felt

Reared from similar gall, swellings mostly basal. Felt' 07a, p. 153

Itonid. Neolasioptera vitinea Felt

Fig. 172. Grape tendril gall, Asteromyia petiolicola Felt. (Original)

Fig. 173. Grape tomato gall, Lasioptera vitis O. S. (Original)

Somewhat cylindrical, reddish petiole galls, length 1.5 to 2.25 cm, diameter 5 to 6 mm, two or three larvae huddled together in cells in the pith

Itonid. Cecidomyia sp. a2684

Irregular, tumid, lobulate, greenish or reddish leaf or tendril gall, diameter .5 to 1.5 cm. Fig. 173. Osten Sacken '62, p. 201

Itonid. Grape tomato gall, Lasioptera vitis O. S.

Reared from similar gall. Felt '15e, p. 134

Itonid. Dasyneura vitis Felt

Reared from similar gall. Felt '15e, p. 206

Itonid. Rhizomyia vitis Felt

Reared from similar gall. Felt '13m, p. 220

Itonid. Brachyneura vitis Felt

Reared from similar gall. Felt '08e, p. 392

Itonid. Janetiella brevicauda Felt

Vein galls, solitary or confluent, frequently distorting the leaf and showing on both surfaces, color yellowish red, more obscure on the upper surface, diameter 10 to 12 mm. Mex. Trotter '11, p. 131

Itonid. Cecidomyia sp.

Circular, pinkish or greenish, pustulate leaf galls, the middle depressed on the upper surface and protuberant on the lower, diameter 2 to 3 mm. Pl. 9, fig. 5

Itonid. Grape blister gall, Cecidomyia sp. a2749

Elongate, conical, reddish or greenish leaf gall, length 6 to 9 mm. Fig. 174. Osten Sacken '62, p. 202

Itonid. Grape tube gall, Cecidomyia viticola O. S.

Fig. 174. Grape tube gall, Cecidomyia viticola O. S. (Original)

Irregular, subglobose leaf gall showing a swelling on the upper surface and a globose enlargement on the lower. Pl. 4, fig. 9.

Lepid. ?Coleophora sp.

Small, wartlike leaf galls on either the upper or the lower surface, diameter 2 to 3 mm.

Aphid. Grape phylloxera, Phylloxera vitifoliae Fitch

Reared from Phylloxera gall. Felt '15e, p. 195

Itonid. Lasiopteryx arizonensis Felt

Reared from similar gall, predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis grassator Fyles

An orange brown to light chocolate colored erineum on the lower surface of the leaf, on V. bicolor. Chadwick '08, p. 150

Acarid. Eriophyes sp.

Small, semicircular or nearly circular, wart galls along the veins and but slightly elevated, on either surface, diameter 2 mm, on V. cordifolia. Chadwick '08, p. 151

Acarid. Eriophyes sp.

Quite distinct from the above, with a long, white pubescence, on the under surface, diameter 5 to 10 mm, on V. cordifolia. Chadwick '08, p. 151

Acarid. Eriophyes sp.

Fig. 175. Astrodiplosis speciosa Felt. Shrunken gall. (Original)

Fig. 176. Linden bark gall, Agromyza tiliae Coud. (Original)

Green, pouch gall with irregularly-lobed top and mostly on the under surface of the leaf, on V. cordifolia. Chadwick '08, p. 151

Acarid. Eriophyes sp.

An erineum on the under side of the leaf, causing a swelling above, on V. vinifera. Chadwick '08, p. 151

Acarid. Eriophyes vitis Land.

A leaf curl or warty, greenish elevation on the upper surface of the leaf, entirely smooth on the underside, becoming brown or reddish when old, on V vinifera. Chadwick '08, p. 151

Acarid. Eriophyes sp.

Irregular, oval cane galls, length 2 cm, diameter 1.5 mm.
Coleop. Grape cane weevil, Ampeloglypter sesostris Lec.

Cissus

Irregular, tumid, stem gall, length 2–9 cm. Fig. 175. Felt '13h, p. 218
Itonid. Astrodiplosis speciosa Felt

Tiliaceae (linden family)

Tilia (linden, basswood)

Irregular, oval, subcortical twig swellings, length 1 cm. Fig. 176. Couden '08, p. 35
Dipt. Linden bark gall, Agromyza tiliae Coud.

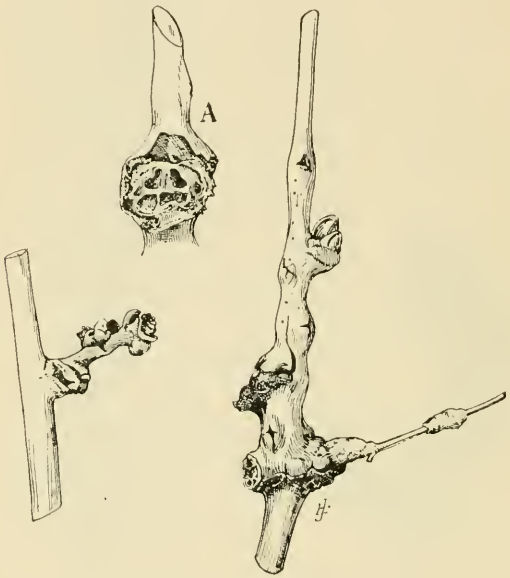

Fig. 177. Linden twig gall, Cecidomyia citrina O. S. Various types. (Original)

Irregular swellings on twigs and petioles, diameter 4 to 8 mm. Fig. 177. Osten Sacken '71, p. 53
Itonid. Linden twig gall, Cecidomyia citrina O. S.[1]
Irregular, subglobular, distorted galls at the base of the leaf or along the mid vein. Felt '15i, p. 156
Itonid. Colpodia pectinata Felt
Subglobular, brownish leaf galls, diameter 3 mm. Pl. 7, fig. 9. Osten Sacken '75, p. 201
Itonid. Linden wart gall, Cecidomyia verrucicola O. S.
Apparently reared from the same gall. Felt '08e, p. 418
Itonid. Porricondyla dilatata Felt

[1] Rearing may prove this insect to be identical with Contarinia tiliarum Kieff.

Top-shaped, greenish leaf galls sometimes very abundant on the upper leaf surface, diameter 2.5 mm. Fig. 178, 179. Felt '06b, p. 631
Acarid. Linden mite gall, Eriophyes abnormis Garm.

Malvaceae (mallow family)

Gossypium (cotton)

Reared from flower buds. Felt '08b, p. 210
Itonid. Cotton bud midge, Contarinia gossypii Felt
Reared from red spider, on cotton. Felt '13n, p. 488
Itonid. Arthrocnodax carolinae Felt
Leaf galls sometimes deforming foliage. Parrott et al. '06, p. 290
Acarid. Eriophyes gossypii Bnks.

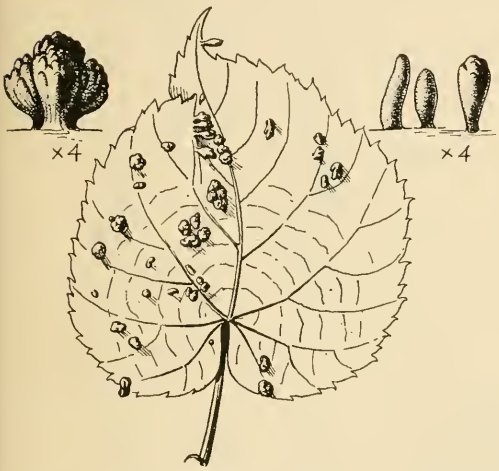

Fig. 178. Linden mite gall, Eriophyes abnormis Garm. Several types of gall in profile and enlarged. (Original)

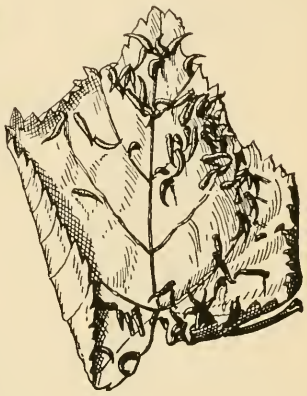

Fig. 179. Linden mite gall, Eriophyes abnormis Garm. Leaf with numerous galls, presumably this species. (Original)

Pocket-like galls on the mid rib, deforming but not preventing leaf development. Pierce and Morrill, '14, p. 20
Itonid. Cecidomyia sp.
Reared from cambium layer. Coq. '05, p. 200
Itonid. Porricondyla gossypii Coq.

Hibiscus moscheutos (swamp rose mallow)

Variably swollen stems. Fig. 180. Felt '07a, p. 155
Itonid. Mallow stem midge, Neolasioptera hibisci Felt

Hypericaceae (St John's-wort family)

Hypericum (St John's-wort)

Axillary bud galls, length 5 mm, on H. mutilum. Felt '15e, p. 187
Itonid. Dasyneura toweri Felt

Globular stalk swellings, length 6 to 10 mm. Beutm. '08, p. 74
Itonid. Cecidomyia triadenii Beutm.

Subglobose stem gall, length 1 cm. Felt '09e, p. 287
Itonid. Lasioptera virginica Felt

An erineum of very fine and numerous black spots on the upper leaf surface of H. virginicum. Chadwick '08, p. 149
Acarid. Eriophyes sp.

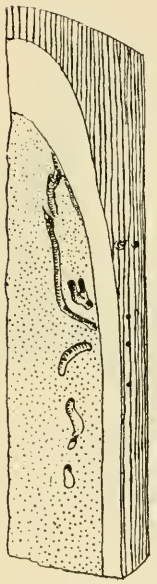

Fig. 180. Mallow stem midge, Neolasioptera hibisci Felt (Author's illustration)

Fig. 181. Asphondylia betheli Ckll. Infested fruit. (Original)

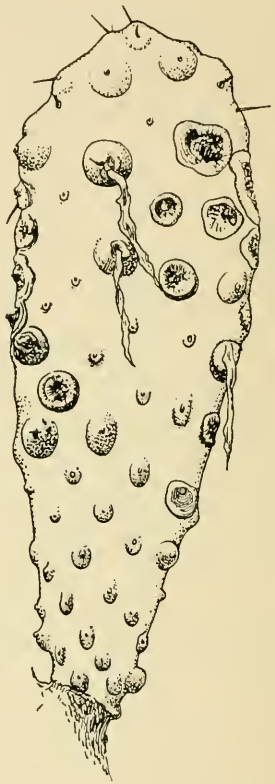

Fig. 182. Cactus midge, Itonida opuntiae Felt, showing characteristic appearance of infested lobe. (Original)

Violaceae (violet family)

Viola (violet)

Deformed fruit, irregular "plumlike," length 1 cm. Felt '15e, p. 166
Itonid. Violet fruit midge, Dasyneura semenivora Beutm.

Rolled, discolored leaves of V. odorata. Felt '07a, p. 59
Itonid. Violet leaf midge, Phytophaga violicola Coq.

Reared from red spider on violet leaves
Itonid. Arthrocnodax sp. a2346

Loasaceae (loasa family)

Mentzelia

Reared from flower buds. Ent., 33:302; Felt '16d, p. 149
Itonid. Asphondylia mentzeliae Ckll.

Cactaceae (cactus family)

Opuntia (prickly pear)

Very large, swollen fruit. Felt '16d, p. 148
Itonid. Asphondylia arizonensis Felt

Swollen fruit. Fig. 181. Cockerell '07, p. 324; Felt '16d, p. 122
Itonid. Asphondylia betheli Ckll.

Swollen leaves. Pl. 5, fig. 6. Felt '08e, p. 124, '16d, p. 144
Itonid. Asphondylia opuntiae Felt

Decayed, frequently yellowish spots at the base of spines. Fig. 182. Felt '10a, p. 10
Itonid. Cactus midge, Itonida opuntiae Felt

Elaeagnaceae (oleaster family)

Shepherdia canadensis

Oval bud gall. Felt '16g, p. 414
Itonid. Asphondylia shepherdiae Felt

Myrtaceae (myrtle family)

Eugenia

Deformed fruit. Felt '12d, p. 106
Itonid. Dasyneura eugeniae Felt

Hairy, globose leaf gall, diameter 1.5 mm. Felt '13a, p. 175
Itonid. Cystodiplosis eugeniae Felt

Lythraceae (loosestrife family)

Decodon (swamp loosestrife)

Globose bud gall, length 3–5 mm. Wells, '14, p. 291
Itonid. ?Dasyneura sp.

Onagraceae (evening primrose family)

Zauschneria

Rosette gall. Fig. 183. Felt '12c, p. 152
Itonid. Thecodiplosis zauschneriae Felt

Umbelliferae (parsley family)

Cicuta (water hemlock)

White larvae, probably on leaves. Felt. '11j, p. 458
Itonid. Cecidomyia sp.

Zizia (golden Alexanders)

Fusiform stem gall, length 3 cm. Fig. 184. Felt '08e, p. 327
Itonid. Lasioptera ziziae Felt

Cornaceae (dogwood family)

Garrya fremontii

Suboval, black, irregular bud gall. Felt '11j, p. 461
Itonid. Asphondylia sp.

Fig. 183. Thecodiplosis zauschneriae Felt. A somewhat shriveled gall. (Original)

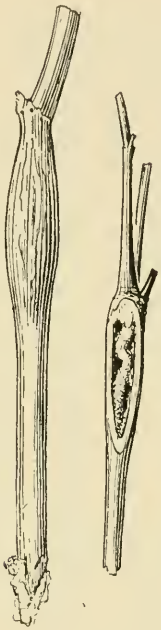

Fig. 184. Lasioptera ziziae Felt. Stem gall, one sectioned. (Original)

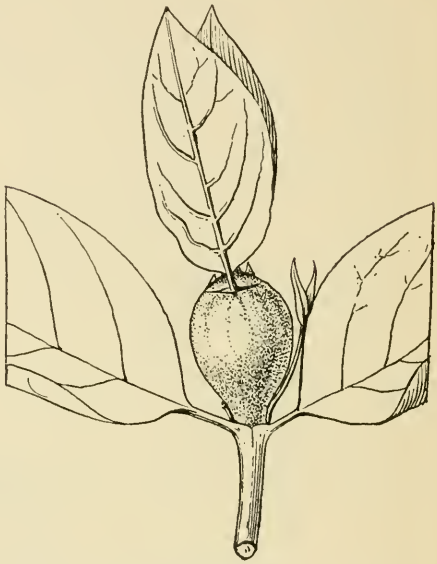

Fig. 185. Dogwood bud gall, Cecidomyia sp. (Original)

Cornus (dogwood)

Ovate, green, red-tinted, succulent, apical, shoot gall, length 1.5 cm, diameter 1 cm, on C. alternifolia. Fig. 185
Itonid. Dogwood bud gall, Cecidomyia sp. a2655

Clavate twig gall, length 1 to 2 cm, on C. florida. Fig. 186. Beutm. '92, p. 269
Itonid. Dogwood club gall, Lasioptera clavula Beutm.

Tubular, curved, green leaf gall, length 8 mm, on C. amomum. Stebb. '10, p. 46
Itonid. Dogwood tube gall, Cecidomyia tuba Stebb.

Yellowish, purple-margined blister leaf gall, diameter 2 to 3 mm, on C. stolonifera. Pl. 13, fig. 9. Felt '07a, p. 107

Itonid. Dogwood spot gall, Lasioptera corni Felt

Irregular, subcortical, stem gall, length 1 to 2 cm, on C. stolonifera. Fig. 187, 188. Beutm. '07, p. 394

Itonid. Dogwood stem gall, Neolasioptera cornicola Beutm.

An erineum in small, blackish spots, on the upper side of the leaf. Chadwick '08, p. 131

Acarid. Eriophyes sp.

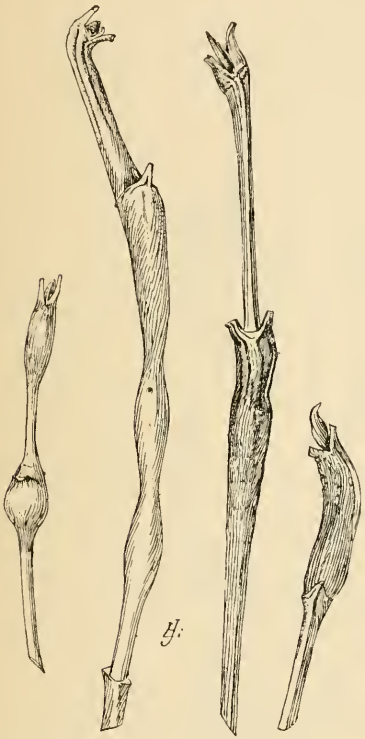

Fig. 186. Dogwood club gall, Lasioptera clavula Beutm., several types. (Original)

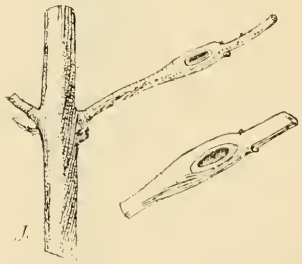

Fig. 187. Dogwood stem gall, Neolasioptera cornicola Beutm. (Original)

Nyssa (black or sour gum)

Twig gall, length 4 to 5 cm, diameter 8 mm. Felt '11j, p. 464

Itonid. Cecidomyia sp.

Marginal leaf fold, length 2.5 to 3.5 mm. Beutm. '07, p. 387

Itonid. Cecidomyia nyssaecola Beutm.

Small, round capsule gall on the leaf, often lobed above, conical below, with an opening at the apex. Chadwick '08, p. 136

Acarid. Eriophyes nyssae Trott.

A narrow infolding of the leaf margin upon the upper surface, dark brown when dry, elegantly scalloped. Chadwick '08, p. 136

Acarid. Eriophyes sp.

Ericaceae (heath family)

Rhododendron nudiflorum (pinxter)

Fusiform, brownish bud gall, length 7 mm. Fig. 189. Felt '16d, p. 119

Itonid. Pinxter bud gall, Asphondylia azaleae Felt

Fig. 188. Cornus twig gall, possibly the work of Neolasioptera cornicola Beutm. (Original)

Fig. 189. Pinkster bud gall, Asphondylia azaleae Felt. (Original)

Gaylussacia frondosa (dangleberry)

Irregular globose monothalamous or lobulate polythalamous leaf gall, diameter 5–10 mm. Beutm. '07c, p. 392

Itonid. Cecidomyia (vaccinii O. S.)

Vaccinium (blueberry, cranberry)

Reared from blueberries (fruit). Woods '16, p. 266

Itonid. Blueberry midge, Lasioptera fructuaria Felt

Apical bud gall on blueberry. Felt '15e, p. 145

Itonid. Blueberry bud gall, Dasyneura cyanococci Felt

Oval, valved midrib leaf gall, length 3 mm, on blueberry. Osten Sacken, '62, p. 196

Itonid. Blueberry leaf gall, Dasyneura gaylussacii Felt (vaccinii O. S., not Smith)

Small, round galls (capsules?) on blueberry leaves. Chadwick '08, p. 150

Acarid. Eriophyes sp.

Irregularly rounded, frequently kidney-shaped, polythalamous, stem gall, green or brown, diameter 12 to 25 mm, on blueberry. Fig. 65, 2–8. Beutm. '09, p. 280

Cynipid. Blueberry stem gall, Solenozopheria vaccinii Ashm.

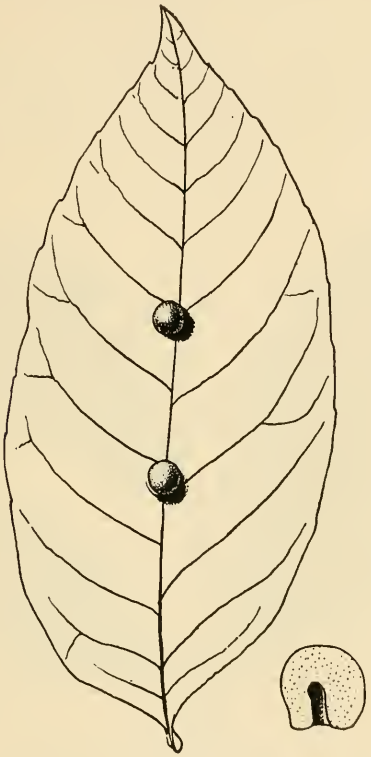

Fig. 190. Ash bullet gall, Cecidomyia pellex O.S. One gall in section and enlarged. (Original)

Leaf fold or bud gall on cranberry. Felt '15e, p. 150

Itonid. Cranberry midge, Dasyneura vaccinii Smith

Plumbaginaceae (leadwort family)

Limonium (sea lavender)

An erineum of very small, black spots on the upper side of the leaves. Chadwick '08, p. 148

Acarid. Eriophyes sp.

Primulaceae (primrose family)

Lysimachia (loosestrife)

Loose, apical bud gall. Pl. 9, fig. 9. Felt '15e, p. 182
Itonid. Loosestrife bud gall, Dasyneura lysimachiae Beutm.

Gall undetected, probably from vegetable matter. Felt '13m, p. 139
Itonid. Lestremia solidaginis Felt

Sapotaceae (sapodilla family)

Bumelia

Probably bud galls, on B. lanuginosa. Felt '16d, p. 124
Itonid. Asphondylia bumeliae Felt

Fig. 191. Ash midrib gall, Contarinia canadensis Felt. (Author's illustration)

Ebenaceae (ebony family)

Diospyros (persimmon)

An erineum in numerous small patches on the upper side of the leaf. Chadwick '08, p. 132
Acarid. Eriophyes sp.

Oleaceae (olive family)

Fraxinus (ash)

Deformed, terminal, leafy buds on white ash. Felt '15e, p. 152
Itonid. Ash bud gall, Dasyneura apicata Felt

Subglobular, white ash leaf galls, diameter 5 mm. Felt '08e, p. 327

Itonid. Lasioptera fraxinifolia Felt

Apparently from the same gall. Felt '08e, p. 416

Itonid. Colpodia temeritatis Felt

Inhabiting a similar gall. Fig. 190. Osten Sacken '62, p. 199

Itonid. Ash bullet gall, Cecidomyia pellex O. S.

Large, tumid midrib gall on white ash, length 5 to 15 mm. Fig. 191. Felt '08e, p. 394

Itonid. Ash midrib gall, Contarinia canadensis Felt

Probably reared from the same gall. Felt '15e, p. 155

Itonid. Dasyneura tumidosae Felt

Reared from tightly-rolled leaves of white ash. Felt '15e, p. 133

Itonid. Dasyneura fraxinifolia Felt

Reared from badly rolled leaves. Fig. 192. Felt '15e, p. 203

Itonid. Rhizomyia fraxinifolia Felt

Fig. 192. Rhizomyia fraxinifolia Felt. Deformed head. (Original)

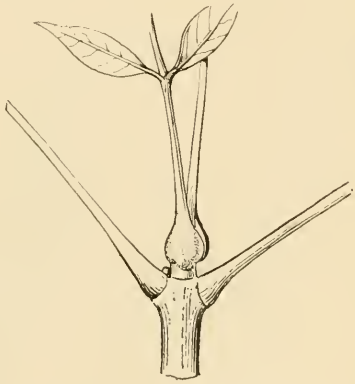

Fig. 193. Ash petiole midge, Phytophaga fraxini Felt. (Original)

Reared from badly rolled leaves of white ash, probably predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis fraxinifolia Felt

Badly curled, purple-streaked terminal leaves. Pl. 15, fig. 3. Felt '11m, p. 39

Hemip. Ash psyllid, Psyllopsis fraxinicola Forst.

Reared from base of leaf petioles of white ash. Fig. 193. Felt '15i, p. 206

Itonid. Ash petiole midge, Phytophaga fraxini Felt

Lobulate deformations of the staminate flowers of white ash, diameter 6 to 12 mm. Pl. 15, fig. 9. Felt '06b, p. 633

Acarid. Ash flower gall, Eriophyes fraxiniflora Felt

Elongate capsule or vein galls on the leaves, pinkish above, whitish beneath, on one side of the vein, on white ash. Chadwick '08, p. 134

Acarid. Eriophyes sp.

Typical capsule leaf galls, small, irregular, circular and light green in color, opening below. Chadwick '08, p. 134

Acarid. Eriophyes sp.

Depressed, wartlike leaf galls on green ash. Parrott et al. '06, p. 290
Acarid. Eriophyes sp.
Hairy, capsule galls on red ash leaves. Pl. 15, fig. 8. Chadwick '08, p. 134
Acarid. Eriophyes fraxini Garm.

Apocynaceae (dogbane family)

Apocynum (dogbane)

Reared from slightly enlarged flower buds. Felt '08e, p. 414
Itonid. Dogbane flower midge, Itonida apocyni Felt
Reared from unopened flower buds, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis apocyniflorae Felt

Fig. 194. Milkweed stem midge, Neolasioptera asclepiae Felt. (Author's illustration)

Fig. 195. Bindweed stem gall, Lasioptera convolvuli Felt. (Author's illustration)

Asclepiadaceae (milkweed family)

Asclepias (milkweed)

Oval, tumid midrib fold, length 7 mm, diameter 4 mm, on A. incarnata Felt '11j, p. 454
Itonid. Cecidomyia sp.
Rusty brown, irregularly swollen leaves, on A. incarnata. Felt '11j, p. 454
Itonid. Cecidomyia sp.
Reared from rolled leaves of A. syriaca, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis asclepiae Felt
Elongate, fusiform stem gall, on A. incarnata. Fig. 194. Felt '08e, p. 332
Itonid. Milkweed stem midge, Neolasioptera asclepiae Felt

Convolvulaceae (convolvulus family)

Ipomoea (morning-glory)

Reared from flower buds. Felt '10b, p. 160
Itonid. Schizomyia ipomoeae Felt

Flower buds. Felt '10c, p. 269
Itonid. Camptoneuromyia meridionalis Felt

Convolvulus sepium (hedge bindweed)

Fusiform stem gall, monothalamous, length 1.5 cm. Fig. 195. Felt '07a, p. 149
Itonid. Bindweed stem gall, Lasioptera convolvuli Felt

Fig. 196. Rhopalomyia audibertiae Felt. Galls on leaf and flower stem. (Original)

Fig. 197. Blue curls stem gall, Stagmatophora sexnotella Chamb. (Original)

Boraginaceae (borage family)

Amsinckia lycopsoides

Reared from an undescribed, presumably bud gall. Felt '16d, p. 106
Itonid. Schizomyia macrofila Felt

Verbenaceae (vervain family)

Verbena (vervain)

Cylindric swelling of the flower stalk of V. rostrata. Felt '12e, p. 150
Itonid. Lasioptera verbeniae Felt

Irregular, oval, stem gall, length 3 to 5 mm. Felt '11j, p. 474
Itonid. Cecidomyia sp.

Reared from marginal leaf rolls. Beutm. '07d, p. 306
Itonid. Vervain leaf midge, Itonida verbenae Beutm.

Reared from rolled leaves, probably predaceous. Felt '08e, p. 408
Itonid. Lestodiplosis verbenifolia Felt

A white and pinkish, frostlike erineum and leaf curl involving the whole plant and apparently very destructive, on V. hastata. Chadwick '08, p. 150
Acarid. Eriophyes sp.

Stachytarpha jamaicensis

Reared from a flower gall, probably produced by mites. Felt '12a, p. 177
Itonid. Hyperdiplosis producta Felt

Clerodendron aculeatum

Reared from a flower bud gall. Felt '09c, p. 300
Itonid. Asphondylia attenuatata Felt

Fig. 198. Cat mint gall, Aylax glechomae Linn. Several types of gall. (Original)

Labiatae (mint family)

Audibertia stachyoides

Subcylindrical, somewhat irregular, the base swollen, grayish or light brown leaf petiole or flower stem galls, length 5 mm, diameter 3 mm. Fig. 196. Felt '07e, p. 18
Itonid. Rhopalomyia audibertiae Felt

Trichostema (blue curls)

Irregular, reniform stem gall, tapering somewhat above, obtuse below, length 18 mm, diameter 6 mm. Fig. 197. Stebb. '10, p. 47
Lepid. Blue curls stem gall, Stagmatophora sexnotella Chamb.

Scutellaria (skullcap)

Oval, greenish, stem gall, length 8 mm. Felt '11j, p. 470
Itonid. Cecidomyia sp.

Nepeta (cat mint)

Globular or irregular, monothalamous or polythalamous leaf petiole or stem gall, the simple galls with a diameter of 6 mm. Fig. 198. 235, 1–3. Beutm. '10a, p. 138

Cynipid. Cat mint gall, Aylax glechomae Linn.

Galeopsis (hemp nettle)

Irregular, stem gall, length .5 to 2 cm. Felt '09e, p. 287

Itonid. Hemp nettle gall, Lasioptera galeopsidis Felt

Salvia (sage)

A conical, thick-walled, grayish brown leaf gall with a length 1 cm and a diameter 6 mm or a tubular, thin-walled leaf gall, with a length of 6 mm, on S. californica and S. nivea. Fig. 199. Felt '16f, p. 184

Itonid. Salvia leaf gall, Rhopalomyia salviae Felt

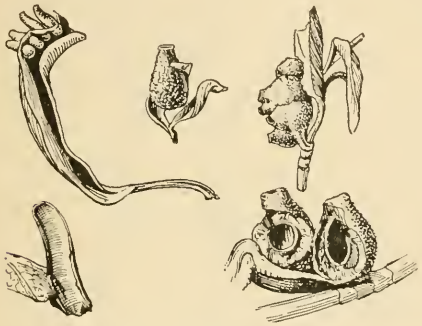

Fig. 199. Salvia leaf gall, Rhopalomyia salviae Felt. Several types of gall, two in section. (Original)

Fig. 200. Cecidomyia sp. on Monarda, a2704, enlarged. (Original)

Monarda fistulosa (wild bergamot)

Variable, stem gall, length 10 to 22 mm. Brodie '94, p. 109

Itonid. Cecidomyia monardi Brodie

Ovate root stalk bud gall, length 2.5 mm, diameter 2 mm. Fig. 200.

Itonid. Cecidomyia sp. a2704

Lycopus (water horehound)

Subglobular, stem gall, length 8 to 10 mm. Fig. 201. Felt '07a, p. 152

Itonid. Lasioptera lycopi Felt

Fusiform stem gall, length 1.5 to 2 cm. Fig. 202. Felt '08e, p. 325

Itonid. Lasioptera mitchellae Felt

Mentha (mint)

Terminal bud gall, length 3 mm, on M. gentilis. Felt '11j, p. 464

Itonid. Cecidomyia sp.

Axillary or terminal bud gall, length 4 mm, on M. ?spicata. Felt '15e, p. 183

Itonid. Spearmint bud gall, Dasyncura aromaticae Felt

Loose bud gall, length 3 mm, on M. piperita. Felt '15e, p. 136

Itonid. Peppermint bud gall, Dasyneura piperitae Felt

Pustule gall in the axil of the leaf, diameter 3.5 mm, on M. canadensis. Felt '08e, p. 405

Itonid. Giardomyia menthae Felt

Polythalamous, stem gall, length 6 to 12 mm. Fig. 203. Felt '09e, p. 288

Itonid. Neolasioptera menthae Felt

Fig. 201. Lasioptera lycopi Felt. (Original)

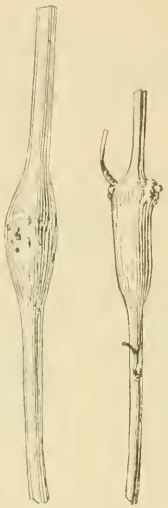

Fig. 202. Lasioptera mitchellae Felt. Two types of gall. (Original)

Collinsonia (horse balm)

Subglobular, pubescent leaf gall, length 4 to 7 mm. Beutm. '08b, p. 703

Itonid. Cecidomyia collinsoniae Beutm.

Narrow, midrib or vein swelling. Beutm. '08b, p. 74

Itonid. Cecidomyia collinsonifolia Beutm.

Solanaceae (nightshade family)

Lycopersicum esculentum (tomato)

Reared from flowers. Felt '11e, p. 303

Itonid. Tomato flower gall, Contarinia lycopersici Felt

Solanum carolinense (horse nettle)

Irregular, spiny, stem gall, length 3.75 to 5 cm. Fig. 204. Felt '07a, p. 164

Itonid. Horse nettle gall, Neolasioptera solani Felt

Scrophulariaceae (figwort family)

Scrophularia (figwort)

Reared from distorted flower buds, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis scrophulariae Felt

Pentstemon (bearded tongue)

Fusiform stem or branch gall, monothalamous, length 15 mm, diameter 3 mm. Fig. 205
Itonid. Lasioptera tibialis Felt

Mimulus (monkey flower)

Stem gall, undescribed. Felt '08e, p. 332
Itonid. Neolasioptera mimuli Felt

Fig. 203. Neolasioptera menthae Felt. One gall in section. (Original)

Fig. 204. Horse nettle gall, Neolasioptera solani Felt. (Author's illustration)

Diplacus

Ovoid, stem gall. Felt '12e, p. 151
Itonid. Lasioptera diplaci Felt

Cabbage bud gall. Fig. 206. Felt '12e, p. 151
Itonid. Asphondylia diplaci Felt

Gerardia flava (downy false foxglove)

Larvae in seed pods. Fig. 207. Felt '11j, p. 461
Itonid. Cecidomyia sp.

"Deformation of the leaf." Chadwick '08, p. 132
Acarid. Eriophyes sp.

Bignoniaceae (bignonia family)

Tecoma (trumpet flower)

Reared from irregularly curled and wrinkled leaves. Felt '06a, p. 127
Itonid. Itonida tecomiae Felt

Catalpa (catalpa)

Reared from dwarfed shoots and pods. Comst. '81, p. 266
Itonid. Catalpa midge, Itonida catalpae Comst.

Plantaginaceae (plantain family)

Plantago (plantain)

Reared from apparently normal plants, probably predaceous. Felt '11j, p. 465
Itonid. ?Lestodiplosis sp.

Rubiaceae (madder family)

Galium (bedstraw)

Aborted flower buds, diameter 3 mm. Felt '15e, p. 168
Itonid. Bedstraw midge, Dasyneura americana Felt

Fig. 205. Lasioptera tibialis Felt. (Original)

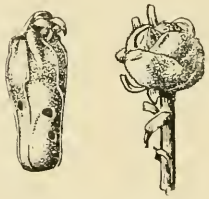

Fig. 206. Asphondylia diplaci Felt. Two types of gall. (Original)

Fig. 207. Cecidomyia sp. Infested seed pods of Gerardia. (Original)

Upper whorls of leaves with the margins longitudinally inrolled, on Galium triflorum
Acarid. Eriophyes galii Karp.

Cephalanthus (buttonbush)

Twig gall, undescribed. Felt '15e, p. 104
Itonid. Buttonbush twig gall, Rhabdophaga cephalanthi Felt

Clusters of small, paler or reddish protuberances (dimples?) on the upper side of the leaf, beneath with a white pubescence, height 1 to 3 mm. Chadwick '08, p. 130
Acarid. Eriophyes cephalanthi Cook

A pocket gall, like that on Salix nigra. Chadwick '08, p. 130
Acarid. Eriophyes sp.

Caprifoliaceae (honeysuckle family)

Diervilla (bush honeysuckle)

Green bud gall or enlarged fruit, length 4 to 5 mm. Felt '16d, p. 140
Itonid. Bush honeysuckle bud midge, Asphondylia diervillae Felt

Reared from apparently normal stems having a diameter of 3 to 4 mm. Felt '07a, p. 162
Itonid. Bush honeysuckle stem midge, Lasioptera caulicola Felt

Lonicera (honeysuckle)

Irregular, lobulate bud gall with a short, rusty brown pubescence, diameter 7 to 10 mm.
Itonid. Cecidomyia sp. a2657

Symphoricarpos (snowberry)

Irregularly thickened, distorted leaflets. Felt '14c, p. 132
Itonid. Thomasia californica Felt

Fusiform twig gall.
Itonid. Cecidomyia sp.

Viburnum (arrowwood)

Globose bud gall, length 4 mm. Felt '16d, p. 104
Itonid. Arrowwood bud midge, Schizomyia viburni Felt

Purplish swellings on the lateral veins, length 5 mm. Pl. 13, fig. 5. Felt '15i, p. 280
Itonid. Purple vein midge, Sackenomyia viburnifolia Felt

Purplish discolorations along the veins, showing on both sides of the leaf and making a striking pattern, on V. pubescens. Fig. 208. Chadwick '08, p. 150
Acarid. Eriophyes sp.

Minute, blister gall on the under side of the leaf, diameter 2 mm. Pl. 9, fig. 7. Felt '11k, p. 480
Itonid. Arrowwood blister midge, Cystiphora viburnifolia Felt

Circular, blister gall, diameter 1.5 to 2 mm, on V. cassinoides. Felt '11j, p. 474
Itonid. Cecidomyia sp.

Pustule, blisterlike gall with pinkish aureola, diameter 3 mm, on V. acerifolium. Felt '11j, p. 474
Itonid. Arrowwood spot gall, Cecidomyia sp.

Inconspicuous, pale green, circular leaf mines, diameter 5 to 6 mm, on V. opulus
Itonid. Cecidomyia sp. a2764

Oval, greenish, blister gall, showing on both surfaces, diameter 2 mm, larvae deep red, escape through a central hole in the upper surface, on V. dentatum. Felt '11j, p. 474
Itonid. Cecidomyia sp.

Large, irregular, lobed dimples, convex above, rarely reversed, pubescent without, long, slender hairs within, on V. dentatum. Chadwick '08, p. 150
Acarid. Eriophyes sp.

Marginal leaf roll, length 10 mm, on V. cassinoides. Felt '11j, p. 474
Itonid. Cecidomyia sp.

Irregular, subcortical gall, length 2 to 6 cm, on V. dentatum. Fig. 209 Beutm. '07c, p. 398
Itonid. Arrowwood stem midge, Neolasioptera viburnicola Beutm.

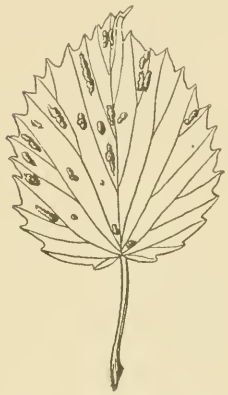

Fig. 208. Eriophyes sp. on Viburnum. (Original)

Fig. 209. Arrowwood stem midge, Neolasioptera viburnicola Beutm. (Original)

Sambucus (elder)

Swollen, unopened florets. Pl. 13, fig. 7. Beutm. '07c, p. 393
Itonid. Elder flower midge, Youngomyia umbellicola O. S.

Bud gall, diameter 1.5 cm. Fig. 210. Felt '16d, p. 139
Itonid. Elder bud midge, Asphondylia sambuci Felt

Leaf margin rolled tightly upward and inward on both sides and bearing stout, whitish or brownish trichomes within. Chadwick '08, p. 147
Acarid. Eriophyes sp.

Rolled leaves, probably predaceous. Pl. 5, fig. 1. Felt '08c, p. 404
Itonid. Arthrocnodax sambucifolia Felt

Irregular, subcortical gall, length 2 to 4 cm. Fig. 211. Felt '06a, p. 132
Itonid. Elder stem midge, Neolasioptera sambuci Felt

Cucurbitaceae (gourd family)

Cucumeris (melon)

Reared from curled, slightly enlarged tips. Lintn. '96, p. 168
Itonid. Melon tip midge, Contarinia setigera Lintn.
Reared from aphids infesting melon tips. Felt '08e, p. 397
Itonid. Melon aphid midge, Aphidoletes cucumeris Lintn.

Fig. 210. Elder bud midge, Asphondylia sambuci Felt. (Author's illustration)

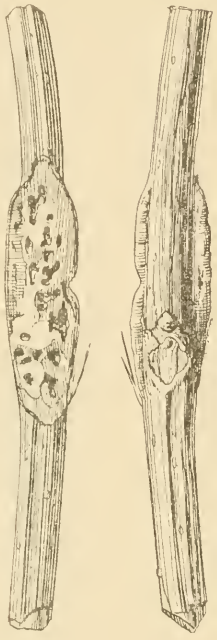

Fig. 211. Elder stem midge, Neolasioptera sambuci Felt. One gall in section and another shown behind the normal stem. (Original)

Compositae (composite family)

Vernonia (ironweed)

Probably from a bud gall. Felt '16d, p. 135
Itonid. Ironweed bud midge, Asphondylia vernoniae Felt
Reared from blossoms. Felt '11k, p. 552
Itonid. Ironweed blossom midge, Youngomyia vernoniae Felt
Reared from deformed florets or an oval petiole or midrib gall, with a length of 6 mm. Beutm. '07c, p. 389
Itonid. Lasioptera vernoniae Beutm.

Eupatorium purpureum (Joe-pyeweed)

Oval, blossom bud gall, length 1 cm. Felt '15e, p. 181
Itonid. Joe-pyeweed blossom midge, Dasyneura purpurea Felt

Eupatorium perfoliatum (thoroughwort, boneset)

Reared from florets. Felt '08e, p. 391
Itonid. Boneset blossom midge, Contarinia perfoliata Felt

Reared from apparently normal florets. Felt '07e, p. 6
Itonid. Clinorhyncha eupatoriflorae Felt

Oval, stem gall, length 1 to 1.5 cm. Felt '07a, p. 156
Itonid. Boneset stem midge, Neolasioptera perfoliata Felt

Reared from apparently the same gall. Felt '13m, p. 221
Itonid. Brachyneura eupatorii Felt

Fig. 212. Tar weed blister midge, Asteromyia grindeliae Felt. (Original)

Fig. 213. Tar weed blossom midge, Rhopalomyia grindeliae Felt. Infested head. (Original)

Fig. 214. Black gouty gall, Asteromyia gutierreziae Felt. (Original)

Eupatorium urticaefolium (white snakeroot)

Globose, flower bud galls, length 6 mm, probably predaceous. Pl. 11, fig. 1. Felt '11k, p. 121
Itonid. Lestodiplosis eupatorii Felt

Subglobular stem gall, length 1.5 cm. Felt '07a, p. 154
Itonid. Neolasioptera eupatorii Felt

Green, fleshy, stem gall similar to the preceding. Felt '11k, p. 546
Itonid. Asphondylia eupatorii Felt

Oval, yellowish leaf mine, diameter 5 to 7 mm.
Itonid. Cecidomyia sp.

Mikania (climbing hempweed)

Fusiform, internodal stem gall, length 1 to 2.5 cm, diameter .5 to 1.25 cm. Wells '14, p. 292
Dipt. ?Trypetid

Grindelia (gum-plant, tar-weed)

Oval, blister leaf gall, greenish or blackish, diameter 3 to 4 mm, on G. robusta, G. cuneifolia. Fig. 212. Felt '12e, p. 149; '16f, p. 180

Itonid. Tar-weed blister midge, Asteromyia grindeliae Felt

Reared from apparently unmodified flower heads. Fig. 213. Felt '16f, p. 186

Itonid. Tar-weed blossom midge, Rhopalomyia grindeliae Felt

Gutierrezia sarothrae

Oval, flower bud gall, length 7 mm. Felt '15i, p. 274

Itonid. Gutierrezia bud midge, Rhopalomyia gutierreziae Ckll.

Slight enlargement of the slender stems, composed of blackened tissue, length 6 to 8 mm, diameter 1 mm. Fig. 214. Felt '16f, p. 179

Itonid. Black gouty gall, Asteromyia gutierreziae Felt

Fig. 215. Downy flower gall, Rhopalomyia anthophila O. S. Cluster of galls. (Original)

Fig. 216. Nun midge, Asphondylia monacha O. S. Apical bud gall. (Original)

Fig. 217. Clarke's goldenrod gall, Rhopalomyia clarkei Felt. (Original)

Chrysopsis (golden aster)

Woolly, polythalamous bud gall, diameter 1.5 cm. Felt '15i, p. 278

Itonid. Golden aster bud midge, Rhopalomyia chrysopsidis Lw.

Solidago (goldenrod)

Flower galls

Greenish or reddish, subglobular, budlike galls, diameter 2 mm, on S. canadensis. Pl. 12, fig. 6. Felt '15i, p. 249

Itonid. Beaked flower gall, Rhopalomyia racemicola O. S.

Green, densely pubescent, cylindrical gall, length 6 mm, on S. canadensis. Fig. 215, pl. 12, fig. 5. Felt '15i, p. 251

Itonid. Downy flower gall, Rhopalomyia anthophila O. S.

Reared from undescribed flower gall. Felt '15i, p. 268

Itonid. Rhopalomyia cruziana Felt

Florets apparently unaffected. Osten Sacken '69, p. 299; Felt, '16d, p. 127
Itonid. Nun midge, Asphondylia monacha O. S.

Florets apparently unaffected, gall undescribed. Felt '16d, p. 143
Itonid. Asphondylia johnsoni Felt

Bud galls

Apical bud galls

Loose, convolute mass of developing leaves, diameter 6.5 mm. Felt '07a, p. 110
Itonid. Asteromyia convoluta Felt

Loose, apical pod of narrow, adherent leaves, on S. canadensis. Felt '15e, p. 199
Itonid. Dryomyia folliculi Felt

Two or more leaves with the edges adherent, length 2.5 to 5 cm, on S. graminifolia. Felt '15e, p. 148
Itonid. Dasyneura flavicornis Felt

Galls pyriform, composed of closely adherent leaves, length 1 mm, on S. graminifolia and S. canadensis. Felt '08e, p. 327
Itonid. Camptoneuromyia flavescens Felt

Probably a loose apical bud gall, on S. graminifolia. Felt '15e, p. 132
Itonid. Dasyneura carbonaria Felt

Subglobose, white or brownish, apical galls on stems or subterranean root stalks, diameter 2.5 cm, on S. juncea. Pl. 12, fig. 9. Felt '15i, p. 242
Itonid. Rootstalk bud midge, Rhopalomyia hirtipes O. S.

Apical, cylindric bud gall on subterranean root stalk, length 6 mm, diameter 2.5 mm. Pl. 12, fig. 7. Felt '15i, p. 260
Itonid. Rhopalomyia bulbula Felt

Apical rosette galls

On Solidago canadensis

Deformed head, diameter about 11 cm, height 3 cm, and composed of numerous smaller heads. Felt '15i, p. 255
Itonid. Rhopalomyia carolina Felt

Gall pyriform, composed of closely adherent leaves, length 1 mm. Felt '08e, p. 327
Itonid. ?Camptoneuromyia flavescens Felt

Globular, the head with a diameter of 4 to 5 cm. Pl. 13, fig. 2. Felt '15i p. 246
Itonid. Goldenrod bunch gall, Rhopalomyia solidaginis Lw.

Large, rosette gall similar to the above. Felt '15j, p. 253
Itonid. Rhopalomyia albipennis Felt

Reared from similar gall. Felt '08e, p. 409
Itonid. Lestodiplosis carolinae Felt

Large, rosette gall, predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis solidaginis Felt

Large, terminal, rosette gall, probably inquiline. Felt '15i, p. 230
Itonid. Oligotrophus inquilinus Fel

On Solidago canadensis and S. serotina

Gall composed of numerous small cells and with a diameter of 2.5 cm. Felt '15i, p. 245

Itonid. Goldenrod rosette midge, Rhopalomyia capitata Felt

Reared from the same gall. Felt '15i, p. 248

Itonid. Rhopalomyia inquisitor Felt

On Solidago graminifolia

Moderately loose apical bud gall, diameter 1 to 1.5 cm, resembles that of Oedaspis polita. Fig. 216, pl. 5, fig. 5. Osten Sacken '69, p. 299; Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

Presumably reared from the same gall. Felt '08e, p. 327

Itonid. Camptoneuromyia flavescens Felt

Gall similar to the above, possibly inquiline. Felt '15j, p. 269

Itonid. Rhopalomyia lanceolata Felt

On Solidago sempervirens

Small, loose apical bud gall as described above. Osten Sacken '69, p. 299. Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

On Solidago altissima

Small, rosette gall, length 12 to 18 mm, and containing a small larval cell. Stebb. '10, p. 52

Dipt. Small rosette gall, Oedaspis polita Lw. Oedaspis atra Lw.

Leaf galls

Galls attached to one or at most two leaves and producing a marked deformity

On Solidago graminifolia

Gall fusiform, sessile, ribbed, greenish, with red markings, length 6 mm. Felt '15i, p. 254

Itonid. Goldenrod ribbed gall, Rhopalomyia fusiformis Felt

Gall fusiform, stemmed, green, red-marked, length 13 to 14 mm. Felt '15i, p. 262

Itonid. Goldenrod stemmed gall, Rhopalomyia pedicellata Felt

On Solidago puberla or S. juncea

Gall oval, irregular, greenish, composed of clusters of root leaves, length 1 cm. Felt '15e, p. 178

Itonid. Dasyneura radifolii Felt

On Solidago rugosa

Gall fusiform, sessile, green, red-marked, length 1.6 mm. Fig. 217. Felt '15i, p. 239

Itonid. Clarke's goldenrod gall, Rhopalomyia clarkei Felt

On Solidago canadensis and S. serotina

Oval gall (Adherent capsule gall) between adherent leaves, diameter 2 mm. Pl. 5, fig. 4. Osten Sacken '69, p. 299. Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

Reared from similar gall. Pl. 5, fig. 4. Felt '08e, p. 291

Itonid. Camptoneuromyia adhesa Felt

Possibly reared from the same gall. Felt '08e, p. 324

Itonid. Lasioptera argentisquamae Felt

Possibly reared from the same gall, probably predaceous. Felt '08e, p. 335

Itonid. Trotteria solidaginis Felt

Blisterlike galls occurring in the leaf tissues and producing at most a slight thickening and discoloration

Gall oval, black, length 4 to 5 mm, on S. graminifolia. Osten Sacken '62, p. 195

Itonid. Black blister gall, Asteromyia carbonifera Felt

Irregular, grayish brown, black-margined, diameter 3 mm, on S. squarrosa. Felt '08e, p. 329

Itonid. Asteromyia squarrosae Felt

Circular, marginal, golden-gray gall, diameter 3.5 mm, on S. canadensis. Felt '08e, p. 329

Itonid. Asteromyia flavoanulata Felt

Circular, variable pink or rosy gall, diameter 1 cm, on S. rugosa. Felt '07a, p. 152

Itonid. Rosy blister gall, Asteromyia rosea Felt

Oval blister gall, on S. canadensis, presumably reared from. Felt '08e, p. 328

Itonid. Asteromyia socialis Felt

Reared from blister gall on Solidago and also from Aster, the gall on the latter with a diameter of 3 to 4 mm. Felt '07a, p. 111

Itonid. Asteromyia albomaculata Felt

Oval, variegated gall, the older ones mostly black, the younger yellowish olive with a darker central nipple, diameter 3 to 6 mm, on S. rugosa. Felt '07a, p. 103

Itonid. Asteromyia rubra Felt

Apparently reared from a similar gall, probably predaceous. Felt '08e, p. 409

Itonid. Lestodiplosis rugosa Felt

Semioval, marginal, yellowish gall, length 1 cm, on S. canadensis. Felt '07a, p. 154

Itonid. Yellow blister gall, Asteromyia flavolunata Felt

Elongate, yellowish brown, blistered area, length 3 cm, on S. canadensis, probably predaceous. Felt '08e, p. 410

Itonid. Lestodiplosis triangularis Felt

Stem and root galls

On Solidago graminifolia

Fusiform, sessile, ribbed, greenish, red-marked gall, length 6 mm. Felt '15i, p. 254

Itonid. Goldenrod ribbed gall, Rhopalomyia fusiformis Felt

Fusiform, stemmed, red-marked, green gall, length 13 to 14 mm. Felt '15i, p. 262

Itonid. Goldenrod stemmed gall, Rhopalomyia pedicellata Felt

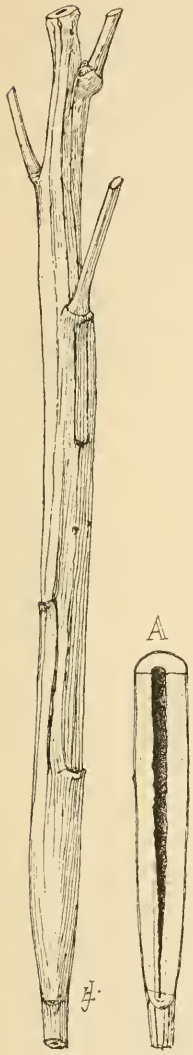

Fig. 218. Goldenrod stem midge, Lasioptera cylindrigallae Felt. (Author's illustration)

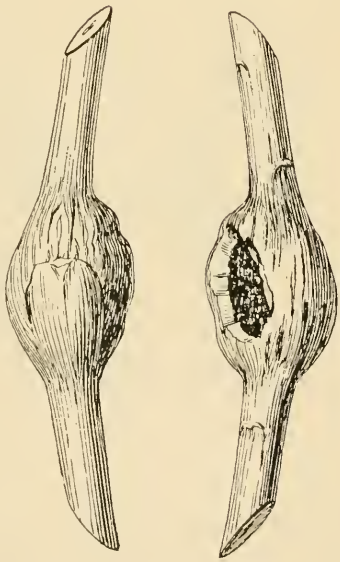

Fig. 219. Knotty goldenrod gall, Lasioptera solidaginis O. S. One gall broken open to show interior. (Original)

Subglobular, green gall near the tip, diameter 1.5 cm. Felt '15i, p. 264

Itonid. Rhopalomyia lobata Felt

A uniform enlargement of the stem, length 10 cm, diameter 7 mm. Fig. 218. Felt '07a, p. 150

Itonid. Goldenrod stem midge, Lasioptera cylindrigallae Felt

On Solidago, various species

Irregular, globo-conical lateral stem gall, greenish, diameter 3 mm, on Solidago occidentalis

Itonid. Cecidomyia sp. a2702

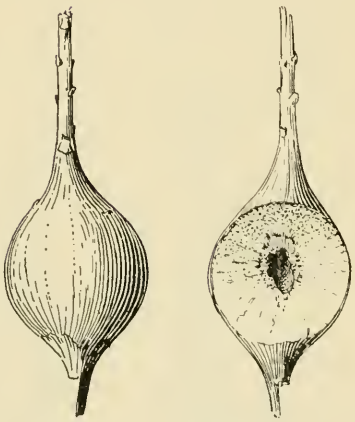

Fig. 220. Goldenrod ball gall, Eurosta solidaginis Fitch. One partly in section. (Original)

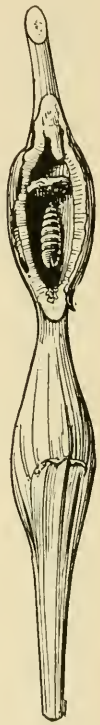

Fig. 221. Elliptical goldenrod gall, Gnorimoschema gallaesolidaginis Riley. One gall in section. (Original)

Irregular, subglobose or fusiform, eccentric enlargement, length 2.5 cm, on S. rugosa. Fig. 219. Osten Sacken '62, p. 368

Itonid. Knotty goldenrod gall, Lasioptera solidaginis O. S (L. tumifica Beutm.)

Globose or subglobose, smooth, brownish and apical on either aerial or subterranean stems, diameter 2.5 cm, on S. juncea. Pl. 12, fig. 9. Felt '15i, p. 242

Itonid. Root stalk bud midge, Rhopalomyia hirtipes O. S.

Cylindric, apical bud gall on subterranean root stalk, length 6 mm, diameter 2.5 mm. Pl. 12, fig. 7. Felt '15i, p. 260

Itonid. Rhopalomyia bulbula Felt

Globular stem gall, diameter 2.5 cm, the interior pithy, with an oval cell in the center. Fig. 220. Stebb. '10, p. 51

Dipt. Goldenrod ball gall, Eurosta solidaginis Fitch

Oval, stem gall, length 1 cm, diameter 4 to 5 mm. Pl. 4, fig. 8. Stebb. '10, p. 51

Lepid. Scarred goldenrod gall, Eucosma scudderiana Clem.

Oval, stem gall on S. sempervirens. Busck '11, p. 4

Lepid. Gnorimoschema salinaris Busck

Gall just above or close to the ground, on S. rigida. Busck '15, p. 82

Lepid. Gnorimoschema gibsoniella Busck

Fig. 222. Aphondylia chrysothamni Felt. Infested heads. (Original)

Fig. 223. Eurosta bigeloviae Ckll. (Original)

Fig. 224. Rhopalomyia utahensis Felt. Bud galls, one in section. (Original)

Fusiform, stem gall, length 3 mm, diameter 1.5 cm, usually near the ground, on Solidago latifolia, S. caesia and Aster divaricatus. Busck '11, p. 6

Lepid. Gnorimoschema gallaeasteriella Kellicott

Elongate, spindle-shaped, stem enlargement of S. canadensis. Fig 221. Stebb. '10, p. 51

Lepid. Elliptical goldenrod gall, Gnorimoschema gallaesolidaginis Riley

Ovoid, solitary or clustered, fleshy, bud galls on the root stalk, length 5 mm, diameter 3 mm. Pl. 13, fig. 4. Felt '15i, p. 257.

Itonid. Rhopalomyia thompsoni Felt[1]

Cylindrical, hollow, budlike gall near the surface, length 2 cm, diameter .5 cm. Pl. 4, fig. 4. Stebb. '10, p. 52

Dipt. Eurosta reticulata Snow

[1] Possibly a synonym of R. hirtipes.

Fusiform, subterranean, bud gall, length 2 to 3 cm. Pl. 4, fig. 5. Thomp. '15, p. 55

Dipt. Eutreta sparsa Wied.

Ovate potato-like root gall, monothalamous, length 20 to 25 mm, diameter 10 to 12 mm. Daecke '10, p. 341

On S. rugosa Dipt. Eurosta comma Wied.
On S. juncea Dipt. Eurosta elsa Daecke.

Bigelovia graveolens (rayless goldenrod)

Swollen or enlarged leaf buds composed of short, ovate, aborted, glumelike leaflets without a distinct central cell, length 5 to 6 mm, diameter 3 mm Fig. 222. Felt '16f, p. 178

Itonid. Asphondylia chrysothamni Felt

void, hypertrophied, monothalamous leaf buds, green or somewhat purplish externally with short, recurved, aborted leaflets covered with a thick, gray pubescence, length 10 to 11 mm, diameter 7 to 8 mm, two or three frequently confluent. Fig. 224. Felt '16f, p. 186

Itonid. Rhopalomyia utahensis Felt

Fig. 225. Rhopalomyia bigelovioides Felt. Infested stem. (Original)

Fig. 226. Rhopalomyia glutinosa Felt. Two infested twigs. (Original)

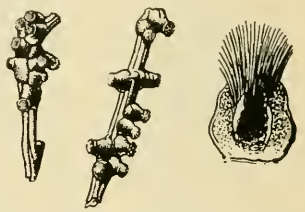

Fig. 227. Rhopalomyia chrysothamni Felt. Two infested twigs and one gall in section, enlarged. (Original)

Ovate, woolly, lateral bud gall, length 1 cm, diameter 7 cm. Fig. 223. Town. '93, p. 48

Dipt. Eurosta bigeloviae Ckll.
Dipt. Oedaspis atra Lw.

Oval, seed gall or an irregular, globose lateral bud swelling. Fig. 225. Felt '15i, p. 265

Itonid. Rhopalomyia bigelovioides Felt

A small, budlike gall. Felt '11j, p. 455

Itonid. Cecidomyia brassicoides Town.

Conelike, probably bud gall. Felt '11j, p. 455

Itonid. Dasyneura strobiloides Town.

Slightly swollen leaflet. Felt '16

Itonid. Asteromyia chrysothamni Felt

Globose or globe-shaped, polythalamous terminal twig enlargement, length 15 to 30 mm, diameter 12 to 20 mm. Fig. 235, 9. Beutm. '10a, p. 143

Cynipid. Aylax chrysothamni Beutm.

Hemispherical or subglobose, green, glabrous, cortical, stem swellings, becoming brown and resembling Lecaniums, diameter 3.5 mm, height 2 mm. Fig. 226. Felt '16f, p. 188

Itonid. Lecanoid gall, Rhopalomyia glutinosa Felt

Conical stem gall, length 4 mm, diameter 3 mm. Fig. 227. Felt '16f, p. 187

Itonid. Rhopalomyia chrysothamni Felt

Hollow, stem gall. Felt '15i, p. 276

Itonid. Rhopalomyia bigeloviae Ckll.

Cylindrical, brown, indistinctly ridged stem gall. Height 2 mm. Diameter. 1.25 mm. Stands at right angles to stem.

Itonid. Cecidomyia sp.

Reared from an oval, subcortical cell, length 2.5 mm, diameter 1 mm, showing practically no enlargement. Felt '16

Itonid. Asteromyia sp

Bigelovia plattensis (rayless goldenrod)

Globose, probably bud gall, diameter 5 to 6 mm.

Itonid. Cecidomyia sp.

Aster

Flower or bud galls

Aborted flower head of Aster patens. Osten Sacken '69, p. 299. Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

Dwarfed or stunted flower heads of Aster paniculatus. Felt '15i, p. 265

Itonid. Rhopalomyia asteriflorae Felt

Axillary bud gall, diameter 3–10 mm, on Aster lateriflorus. Pl. 13, fig. 1. Felt 15i, p. 247

Itonid. Rhopalomyia lateriflori Felt

Ovate, axillary bud gall, length 2 to 4 mm, diameter 2 mm, on A. undulatus. Pl. 13, fig. 3

Cecid. Rhopalomyia sp.

Blister leaf galls

Circular, yellowish white gall, diameter 2 to 3 mm, on Aster macrophyllus. Felt '09e, p. 287

Itonid. Lasioptera clarkei Felt

Narrowly oval, yellowish brown gall, length 4 mm, diameter 2 mm. Felt '09e, p. 286

Itonid. Asteromyia dumosae Felt

Circular, brownish, yellow-ringed gall, diameter 3 mm. Felt '09e, p. 286

Itonid. Asteromyia waldorfi Felt

Oval, yellowish, shining gall, diameter 6 to 7 mm. Felt '09e, p. 286

Itonid. Asteromyia nitida Felt

Large, oval, pinkish blotches, diameter 10 to 12 mm, on Aster divaricatus. Felt '08e, p. 330

Itonid. Asteromyia divaricata Felt

Irregularly oval, yellowish or brownish gall, diameter 6 mm, on Aster paniculatus. Felt '07a, p. 109

Itonid. Asteromyia paniculata Felt

Oval, blackish gall, diameter 4 mm, on A. undulata. Felt '11k, p. 481
A similar, possibly the same gall, occurs on Ionactis linearifolius. Pl. 5, fig. 7. Felt, '11j, p. 481

Itonid. Asteromyia reducta Felt

Oval, greenish yellow or papery white gall, diameter 1.75 cm, on Aster laevis. Felt '07a, p. 108

Itonid. Papery blister gall, Asteromyia laeviana Felt

Oval leaf gall, sooty yellow beneath, dirty white above, length 2 cm, diameter 1.2 cm. Felt '08e, p. 329

Itonid. Asteromyia flavomaculata Felt

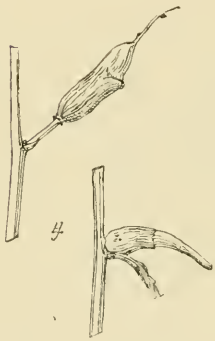

Fig. 228. Aster stem gall, Neolasioptera ramuscula Beutm. (Author's illustration)

Fig. 229. Neolasioptera albitarsis Felt. A series of galls. (Original)

Circular, yellowish white, dark margined gall, diameter 3 mm, on Aster lateriflorus. Beutm. '07c, p. 395

Itonid. Asteromyia asterifoliae Beutm.

Oval, green swellings, length 2 mm, diameter 1.5 mm. Felt '09e, p. 286

Itonid. Asteromyia vesiculosa Felt

Circular, yellowish or brownish gall, diameter 3 to 4 mm, on Aster cordifolius. Can. Ent. 47:228

Itonid. Asteromyia sylvestris Felt

Stem or branch galls

Small, pustulate swellings on the stems, diameter 3 mm. Felt '08e, p. 328

Itonid. Asteromyia pustulata Felt

Oval twig gall, length 1.5 cm, on Aster novae-angliae. Felt '15i, p. 259

Itonid. Rhopalomyia astericaulis Felt

Fusiform stem or branch gall, length 1 cm, diameter .4 cm. Fig. 228. Beutm. '07c, p. 392

Itonid. Aster stem gall, Neolasioptera ramuscula Beutm.

Fusiform, greenish brown, irregular stem swelling at or near the base of the leaf, length 1 cm, diameter .6 cm, on Aster infirmus. Fig. 229. Felt '07a, p. 153

Itonid. Neolasioptera albitarsis Felt

Fig. 230. Horseweed blister midge, Asteromyia modesta Felt. (Author's illustration)

Fig. 231. Horseweed stem midge, Neolasioptera erigerontis Felt. (Original)

Fig. 232. Rhopalomyia erigerontis Felt. Typical gall. (Original)

Fusiform stem gall, length 2 cm, diameter 1 cm, on Aster umbellatus. Fyles '11, p. 135

Lepid. Gnorimoschema gallaediplopappi Fyles

Fusiform stem gall, length 3 cm, diameter 1.5 cm, usually near the ground, on Aster divaricatus, Solidago latifolia and S. caesia. Busck '11, p. 6

Lepid. Gnorimoschema gallaeasteriella Kell.

Spindle-shaped, stem or root galls, length 15 mm, diameter 6 to 8 mm, near or beneath the surface of the ground, on Aster multiflorus. Busck '11, p. 5

Lepid. Gnorimoschema subterranea Busck

Ovate, sessile, brownish, densely white-haired galls, length 7 mm, on Aster crassulus. Felt '15i, p. 237

Itonid. Rhopalomyia crassulina Ckll.

Acamptopappus spharocephalus

Gall-like swellings on tips of branches. Busck '03, p. 830

Lepid. Gnorimoschema octomaculella Chamb.

Erigeron canadensis (horseweed, butterweed)

Reared from a scarcely discolored, inconspicuous blister mine. Fig. 230. Felt '07a, p. 163

Itonid. Horseweed blister midge, Asteromyia modesta Felt

Fusiform stem gall, length 2 cm. Fig. 231. Felt '07a, p. 163

Itonid. Horseweed stem midge, Neolasioptera erigerontis Felt

Fig. 233. Rhopalomyia ericameriae Felt. Typical rosette galls. (Original)

Fig. 234. Paradiplosis partheniicola Ckll. (Original)

Erigeron fragilis

Oval apical bud gall, length 10 mm, diameter 7 mm. Fig. 232. Felt '16f, p. 189

Itonid. Rhopalomyia erigerontis Felt

Sericocarpus asteroides (white-topped aster)

Apical, greenish bud gall. Felt '16d, p. 127

Itonid. ? Nun midge, Asphondylia monacha O. S. a2347

Baccharis pilularis (groundsel tree)

Flower bud or leaf gall, single or clustered, lobulate, greenish or reddish brown, diameter 5 mm to 1.5 cm. Felt '15i, p. 255

Itonid. Rhopalomyia californica Felt

Fig. 235. Aylax galls. 1–3. Cat mint gall, A. glechomae Linn. 4, 5. Gall of rosin weed stem wasp, A. leavenworthi Bass. 6. Gall of rosin weed flower wasp, A. laciniatus Gill. 7. Gall of A. rufus Gill. 8. Gall of dandelion gall waso, A. taraxaci Ashm. 9. Gall of A. chrysothamni Beutm. 10. Gall of A. pisum Walsh. (After Beutm., Am. Mus. Nat. Hist.)

Lobulate bud gall. Felt '11j, p. 455

Itonid. Rhopalomyia sp.

Globose, fleshy, terminal, polythalamous twig gall, diameter 7 to 12 mm. Felt '16

Itonid. Cecidomyia sp.

Stem gall. Felt '15i, p. 256

Itonid. Rhopalomyia baccharis Felt

Stem gall. Busck '03, p. 827

Lepid. Gnorimoschema baccharisella Busck

Ericameria

Small, rosette galls, the leaflets more or less recurved, really aborted branchlets and usually on the main stalk near the ground, length 12 mm, diameter 8 mm. Fig. 233. Felt '16f, p. 190

Itonid. Rhopalomyia ericameriae Felt

Antennaria (everlasting, ladies' tobacco)

Corm-shaped bud gall, the leaflets recurved, length 8 to 12 mm. Felt '16d, p. 133

Itonid. Everlasting bud midge, Asphondylia antennariae Whlr.

Elongate, oval bud galls, the leaflets scarcely recurved, length 3 to 5 mm. Felt '15i, p. 270

Itonid. Rhopalomyia antennariae Whlr.

Globose, white, woolly masses with white fibers 5 mm long radiating from hard, thin-shelled cells. Felt '15i, p. 266

Itonid. Woolly bud midge, Rhopalomyia pilosa Felt

Gnaphalium (cudweed)

Narrowly ovate, white, woolly bud gall

Itonid. Cudweed bud gall, Asphondylia sp. a2697

Silphium (rosinweed)

Ovate, frequently clustered, flower galls, length 4 to 5 mm. Fig. 235, 6. Beutm. '10a, p. 140

Cynipid. Rosinweed flower wasp, Aylax laciniatus Gill.

Irregular, apical, polythalamous, green, stem swellings, length 30 to 75 mm. Fig. 235, 4, 5. Beutm. '10a, p. 139

Cynipid. Rosinweed stem wasp, Aylax leavenworthi Bass.

Inhabiting oval cells in apparently normal stems. Fig. 235, 7. Beutm. '10a, p. 141

Cynipid. Aylax rufus Gill.
Aylax gillettei Kieff.

Parthenium

Woolly gall, diameter 5 mm. Fig. 234. Ckll. '00, p. 201

Itonid. Paradiplosis partheniicola Ckll.

Iva (related to I. axillaris)

Globular, pubescent, yellowish or greenish, pouch gall on the upper leaf surface, length 1.5 mm.

Acarid. Eriophyes sp. a2717

Ambrosia (ragweed)

Presumably from a stem gall, the latter possibly identical in appearance with that of a Lepidopteron. Beutm. '10b, p. 256

Cynipid. Ragweed stem wasp, Aulacidea ambrosiaecola Ashm.

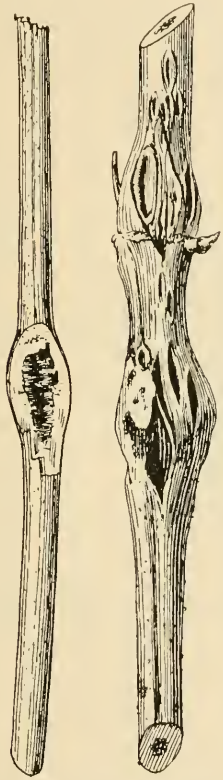

Fig. 236. Ragweed stem gall, Neolasioptera ambrosiae Felt. One gall in section. (Original)

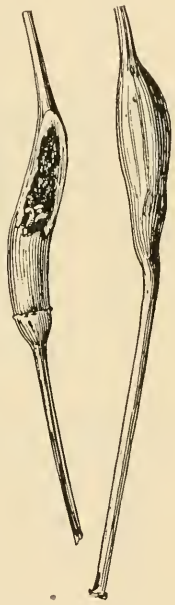

Fig. 237. Sunflower stem midge, Lasioptera weldi Felt. One gall partly in section. (Original)

Reared from stems of giant ragweed. Fig. 236. Felt '09e, p. 288

Itonid. Ragweed stem midge, Neolasioptera ambrosiae Felt

Rudbeckia (cone-flower)

Deformed, enlarged florets, the affected ones leafy. Beutm. '07c, p. 388

Itonid. Cecidomyia rudbeckiae Beutm.

Irregular, subglobular, apical, bud gall, diameter 4 cm. Pl. 5, fig. 2. Osten Sacken '71, p. 51. Felt '16d, p. 146

Itonid. Cone-flower gall, Asphondylia conspicua O. S.

Nodular, stem gall. Felt '11j, p. 468

Itonid. Cecidomyia sp.

Undetected gall, possibly from an apparently unmodified stem. Felt '08e, p. 324

Itonid. Cone-flower stem midge, Lasioptera rudbeckiae Felt

Lepachys

Deformed flower bud. Cook '04a, p. 116

Itonid. Cecidomyia sp.

Helianthus (sunflower)

Sunflower seeds apparently normal. Felt '09e, p. 288

Itonid. Sunflower seed midge, Lasioptera murtfeldtiana Felt

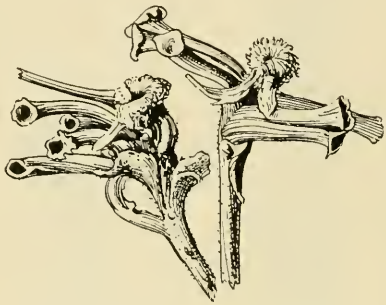

Fig. 238. Tubular bud gall, Hormomyia helianthi Brodie. (Original)

Subglobular leaf gall, diameter 6 to 7 mm. Pl. 10, fig. 5. Felt '14e, p. 286

Itonid. Sunflower bullet gall, Hormomyia bulla Felt

Globular or spherical, stem galls, diameter 1 to 4 cm. Pl. 5, fig. 3. Osten Sacken '69, p. 301. Felt '16d, p. 131

Itonid. Sunflower purse gall, Asphondylia globulus O. S.

Stem gall undescribed. Osten Sacken '71, p. 51. Felt '16d, p. 146

Itonid. Asphondylia conspicua O. S.

Stem gall, on H. divaricatus. Brodie '94, p. 73

Itonid. Cecidomyia thurstoni Brodie

Fusiform stem gall, length 3 cm, diameter .7 mm. Fig. 237. Felt '08e, p. 326

Itonid. Sunflower stem midge, Lasioptera weldi Felt

Stem gall undescribed. Felt '11k, p. 484

Itonid. Neolasioptera trimera Felt

Helianthus strumosus

Flower heads apparently unmodified. Felt '16, p. 120

Itonid. Asphondylia helianthiflorae Felt

Tubular, axillary bud gall, length 10 to 25 mm. Fig. 238. Felt '13d, p. 418
Itonid. Tubular bud gall, Hormomyia helianthi Brodie
Reared from undetected gall. Felt '07e, p. 7
Itonid. Neolasioptera helianthi Felt

Actinomeris alternifolia

Globose bud gall. Beutm. '07c, p. 391
Itonid. Cecidomyia ? verbesinae Beutm.

Helenium (sneezeweed)

Apical rosette gall, length 2 to 3 cm. Beutm. '07c, p. 383. Felt '16d, p. 137
Itonid. Asphondylia autumnalis Beutm.
Small stems with the pith tunneled by orange-colored larvae
Itonid. Cecidomyia sp. a274

Fig. 239. Rhopalomyia alticola Ckll. (Author's illustration)

Fig. 240. Diarthronomyia floccosa Felt. (Original)

Fig. 241. Diarthronomyia californica Felt. Three galls. (Original)

Fig. 242. Rhopalomyia betheliana Ckll. Cluster of galls. (Original)

Achillea (yarrow)

Florets apparently normal. Felt '08e, p. 333
Itonid. Yarrow flower midge, Clinorhyncha millefolii Wachtl.
Irregularly oval, flower bud gall with a whitish pubescence, length 7 mm.
Itonid. ?Rhopalomyia millefolii H. Lw.

Anthemis (chamomile)

Larvae in flower heads. Felt '11j, p. 453
Itonid. Cecidomyia sp.

Chrysanthemum

Swollen stems, leaf stalks or deformed buds containing oval, frequently coalescent cells with a length about 2 mm. Pl. 10, fig. 4. Felt '16d, p. 51

Itonid. Chrysanthemum midge, Diarthronomyia hypogaea H. Lw.

Artemisia californica

Irregular, lobulate, woolly masses apparently arising from lateral buds and frequently confluent; individual galls with a diameter of about 4 mm. Fig. 240. Felt '16f, p. 195

Itonid. Diarthronomyia floccosa Felt

Subconical, thin-walled, obliquely set, brownish or reddish leaf gall, length 1.5 mm, diameter .5 mm. Fig. 241. Felt '12j, p. 193

Itonid. Diarthronomyia californica Felt

Artemisia caudata

Oval, woolly, apical or lateral bud galls, diameter 1 to 1.5 cm, consisting of a series of oval cells with a length of about 2 mm and with numerous long fibers. Felt '15i, p. 272

Itonid. Woolly wormwood gall, Rhopalomyia ?alticola Ckll.

Artemisia forwoodii (?canadensis)

Globular, woolly galls, diameter about 1 cm. Fig. 239. Felt '15i, p. 272

Itonid. Woolly wormwood gall, Rhopalomyia alticola Ckll.

Artemisia frigida

Fusiform, flower or leaf bud galls, length 4 mm, also on A. filifera. Fig. 242. Felt '15i, p. 238

Itonid. Rhopalomyia betheliana Ckll.

Artemisia gnaphalodes

Irregular, lobulate, polythalamous, white, pubescent gall, diameter 1 cm. Felt '11k, p. 484

Itonid. Rhopalomyia gnaphalodis Felt

Artemisia heterophylla

Ovate, thin-walled, oblique leaf galls, length 1 mm, also breeds in apparently normal flower buds. Fig. 244. Felt '16f, p. 194

Itonid. Diarthronomyia occidentalis Felt

Artemisia species (wormwood)

Deformed flower heads, length 10 mm, diameter 5 to 6 mm. Felt '11j, p. 453

Itonid. Wormwood flower midge, Rhopalomyia coloradella Ckll.

Bud galls, presumably. Felt '16d, p. 133

Itonid. Asphondylia artemisiae Felt

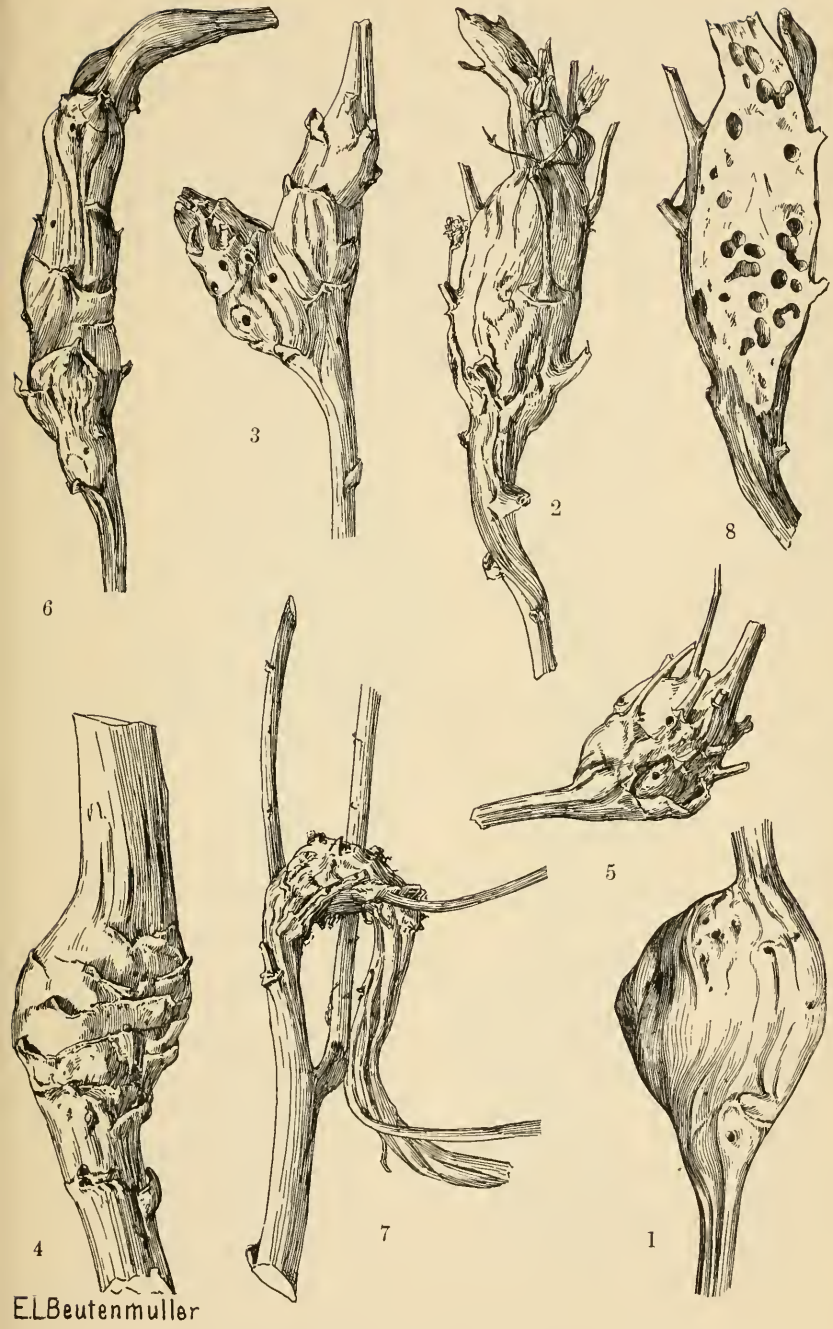

Fig. 243. Lettuce tumor gall, Aulacidea tumida Bass. 1–8 showing various types. (After Beutm., Am. Mus. Nat. Hist.)

A bud deformation of black, globose or densely-crowded filaments. Chadwick '08, p. 127

Acarid. Eriophyes sp.

Ovate masses of linear, modified leaves occurring on the branchlets of a species of Artemisia, length of mass 1.5 cm, diameter 5 to 7 cm.

Acarid. Eriophyes sp., a2733

Subconical, short-wooled, yellowish gray, axillary bud gall, length 2 cm, diameter 1 cm. (Collected by L. H. Weld)

Dipt. Trypetid a2774

Globose, axillary, woolly bud gall, diameter 7 to 10 mm, the hairs grayish white, short and thick. (Collected by L. H. Weld)

Dipt. Trypetid a2773

Artemisia tridentata (sage bush)

Oval, budlike, flower gall the size of a pea. Felt '15i, p. 271

Itonid. Rhopalomyia tridentatae Rubs.

Fig. 244. Diarthronomyia occidentalis Felt. Galls on A. heterophylla. (Original)

Fig. 245. Diarthronomyia artemisiae Felt. Several types of spongy gall, one in section. (Original)

Ovate, hard, thick-walled, yellowish brown bud gall, length 1.5 cm, diameter .8 cm. (Collected by L. H. Weld)

Dipt. Trypetid a2775

Flask-shaped leaf gall, length 4 mm, diameter 2 mm. Fig. 247. Felt '16f, p. 185

Itonid. Wormwood flask gall, Rhopalomyia ampullaria Felt

Oval, grayish or almost black, solitary or clustered gall on the under side of the leaves, length 1.5 cm. Fig. 248. Felt '16f, p. 194

Itonid. Diarthronomyia occidentalis Felt

Globose, variable, monothalamous or polythalamous leaf bud or rosette galls, or a bladdery gall arising from the leaf, pubescence variable, dimensions 3 to 15 mm. Fig. 245. Felt '16f, p. 193

Itonid. Diarthronomyia artemisiae Felt

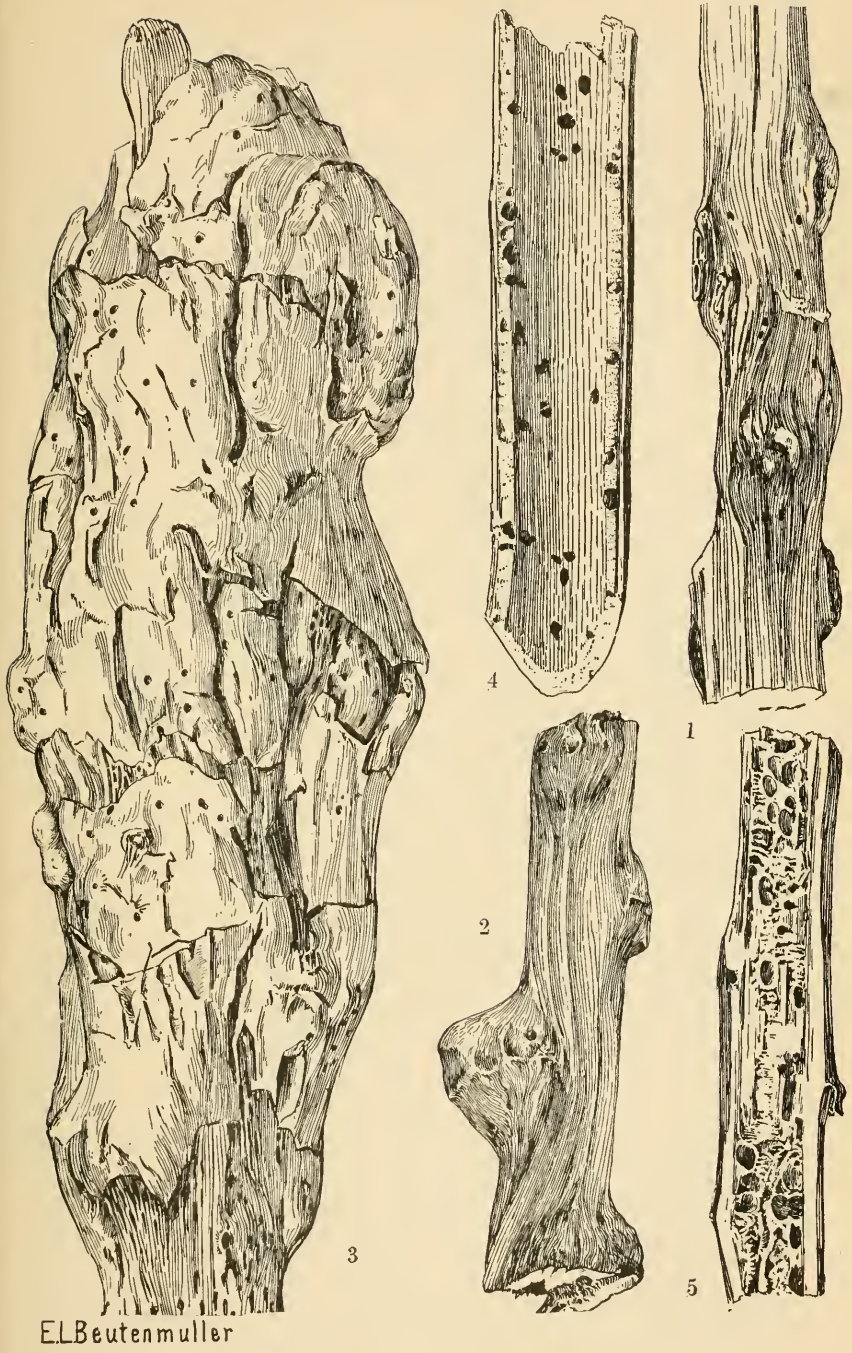

Fig. 246. Wild lettuce galls. 1–4. Aulacidea podagrae Bass. 5. A. bicolor Bass. (After Beutm., Am. Mus. Nat. Hist.)

Subglobular, brown, spongy, apical gall, diameter 1.8 cm, possibly identical with the preceding. Felt '11j, p. 453

Itonid. Cecidomyia sp.

Senecio (groundsel, ragwort, squaw-weed)

Flower heads, presumably unmodified. Felt '15i, p. 237

Itonid. Rhopalomyia cockerelli Felt

Stem gall undescribed. Felt '11k, p. 482

Itonid. Lasioptera arizonensis Felt

Tetradymia spinosa (salt bush)

Fusiform, woolly, hollow stem enlargement, length 3 cm. diameter 1 cm. Busck '03, p. 834

Lepid. Gnorimoschema ? tetradymiella Busck

Arctium (burdock)

Yellowish larvae in burs. Felt '11j, p. 453

Itonid. Cecidomyia sp.

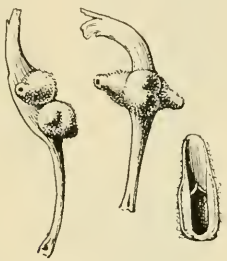

Fig. 247. Wormwood flask gall, Rhopalomyia ampullaria Felt. Two clusters of gall, one in section, the last enlarged. (Original)

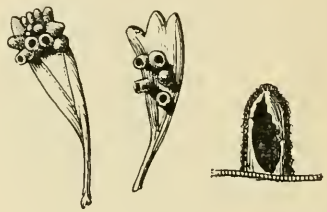

Fig. 248. Diarthronomyia occidentalis Felt. Gall on A. tridentata, one in section, much enlarged. (Original)

Taraxacum (dandelion)

Oblong, irregular, polythalamous, petiole or midrib swellings, length 25 to 50 mm. Fig. 235, 8. Beutm. '10a, p. 142

Cynipid. Dandelion gall wasp, Aylax taraxaci Ashm.

Lactuca (lettuce)

Irregular stem gall, diameter 1.75 cm. Felt '07a, p. 151

Itonid. Lettuce stem midge, Lasioptera lactucae Felt

Rounded, elongate, irregular, polythalamous, stem swelling, length 25 to 75 mm. Fig. 243. Beutm. '10b, p. 253

Cynipid. Lettuce tumor gall, Aulacidea tumida Bass.

Occurring in the pith, sometimes causing a stem swelling. Fig. 246, 1–4, pl. 3, fig. 6. Beutm. '10b, p. 254

Cynipid. Aulacidea podagrae Bass.

Occurring in thin-walled cells in the pith of the stem. Fig. 246, 5. Beutm. '10b, p. 255

Cynipid. Aulacidea bicolor Bass.

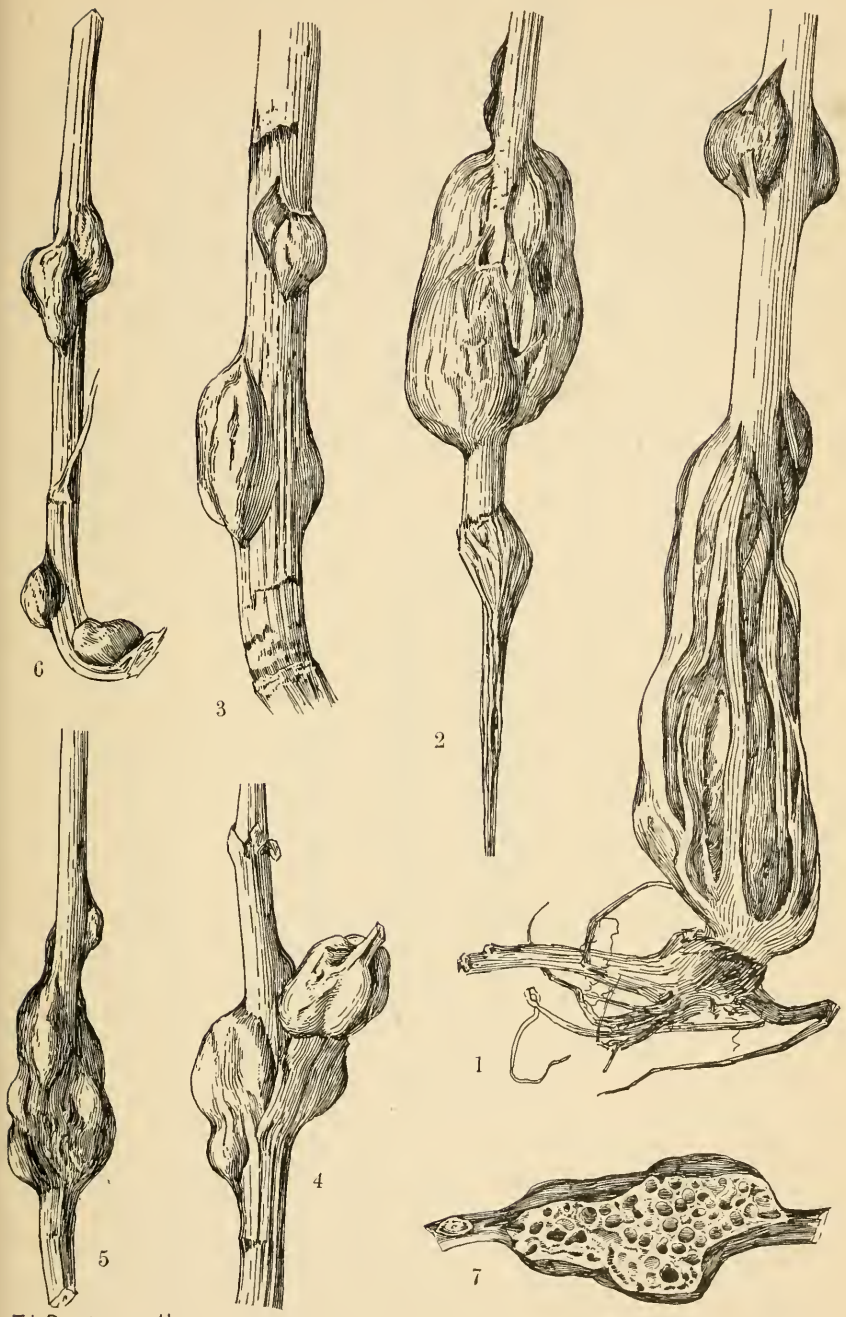

Fig. 249. Rattlesnake root gall, A u l a c i d e a n a b a l i Brodie. 1–7 showing various types of the gall. (After Beutm., Am. Mus. Nat. Hist.)

Sonchus (sow thistle)

Reared from stems. Ashm. '97e, p. 134
Cynipid. Lettuce tumor gall, Aulacidea tumida Bass.

Encelia

Leaf bud gall, length 10 mm, diameter 4 mm. Felt '12e, p. 152
Itonid. Asphondylia enceliae Felt

Conical, thick-walled, lateral bud gall, length 6 mm, diameter 3 mm, frequently confluent basally, sometimes twisting the stem and producing a marked deformation. Felt '16f, p. 183
Itonid. Rhopalomyia enceliae Felt

Lygodesmia

Oval or pea-like, monothalamous stem galls, diameter 5 to 12 mm. Fig. 235, 10. Beutm. '10a, p. 142
Cynipid. Aylax pisum Walsh

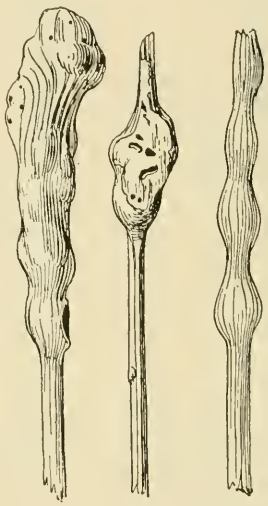

Fig. 250. Lasioptera palustris Felt. A group of galls, one sectioned. (Original)

Prenanthes (rattlesnake-root)

Flat, purplish leaf gall, length 2 to 3 mm. Felt '13d, p. 417
Itonid. Cystiphora canadensis Felt

Irregular, polythalamous, basal, stem swelling somewhat resembling small, knotty artichokes, diameter 5 to 10 mm. Fig. 249. Beutm. '10b, p. 256
Cynipid. Aulacidea nabali Brodie

American Insect Galls

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonidae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Polypodiaceae								
Cystopteris								
Cecidomyia	1							
Ephedraceae								
Ephedra								
Lasioptera	3							
Pinaceae	38	2	1		3	1		2
Pinus								
Cecidomyia	5							
Chermes					1			
Contarinia	1							
Dicrodiplosis	1							
Janetiella	1							
Monardia	2							
Mycodiplosis	1							
Podapion			1					
Retinodiplosis	6							
Thecodiplosis	1							
Winnertzia	1							
Picea								
Chermes					3			
Abies								
Cecidomyia	1							
Dasyneura	1							
Phytophaga	1							
Rhabdophaga	1							
Taxodium								
Itonida	2							
Thecodiplosis	1							
Retinodiplosis	1							
Chamaecyparis								
Cecidomyia	1							
Janetiella	1							
Thuja								
Eriophyes								1
Rhopalomyia	1							
Tsuga								
Camptomyia	1							
Juniperus								
Allomyia	1							
Arthrocnodax	1							
Cecidomyia	2							
Chalcid						1		
Cynipid		2						
Eriophyes								1
Oligotrophus	1							
Walshomyia	1							
Sabina								
Walshomyia	1							
Gramineae	33			4		21		2
Triticum								
Cecidomyia	2							
Cephus						2		
Chlorops				1				
Isosoma						3		
Itonida	1							
Lestodiplosis	1							
Lestremia	1							
Oscinis				1				
Phytophaga	1							
Prodiplosis	1							
Thecodiplosis	1							
Eriocoma								
Isosoma						1		
Tripsacum								
Lasioptera	1							
Sorghum								
Contarinia	1							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Sorghastrum								
Contarinia	1							
Digitaria								
Chlorops				1				
Panicum								
Lasioptera	2							
Echinochloa								
Lasioptera	1							
Setaria								
Contarinia	1							
Aristida								
Siteroptes								1
Muhlenbergia								
Asteromyia	1							
Cecidomyia	1							
Chlorops				1				
Isosomorpha						1		
Lasioptera	1							
Phleum								
Cephus						1		
Alopecurus								
Itonida	1							
Sporobolus								
Siteroptes								1
Agrostis								
Dasyneura	1							
Isosoma						1		
Avena								
Coquillettomyia	1							
Mycodiplosis	1							
Prionellus	1							
Danthonia								
Lasioptera	1							
Tridens								
Contarinia	1							
Eurytomocharis						1		
Eragrostis								
Eurytomocharis						1		
Neolasioptera	1							
Distichlis								
Anthracophaga				1				
Asteromyia	1							
Siteroptes								1
Poa								
Colpodia	2							
Isosoma						2		
Bromus								
Cephus						1		
Isosoma						2		
Agropyron								
Cephus						1		
Isosoma						2		
Phytophaga	1							
Hordeum								
Isosoma						1		
Phytophaga	1							
Secale								
Isosoma						2		
Elymus								
Cephus						1		
Isosoma						2		
Phytophaga	1							
Rhabdophaga	1							
Cyperaceae	4							
Cyperus								
Hormomyia	1							
Dulichium								
Lestodiplosis	1							
Thecodiplosis	1							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Scirpus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Juncaceae								
Juncus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Livia	.....	.....	.....	.....	1	.....	.....	.....
Liliaceae	11	1	.....	.....	.....	.....	.....	.....
Oakesia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Yucca								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Smilacina								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Maianthemum								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Polygonatum								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Smilax								
Camptoneuromyia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	1	.....	.....	.....	.....	.....	.....
Dioscoreaceae								
Dioscorea								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Iridaceae								
Iris								
Agromyza	.....	.....	.....	1	.....	.....	.....	.....
Orchidaceae								
Cattleya								
Isosoma	.....	.....	.....	.....	.....	1	.....	.....
Parallelodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Salicaceae	66	.....	5	6	.....	14	1	23
Salix								
Acarus	.....	.....	.....	.....	.....	.....	.....	1
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Asynapta	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Clinorhyncha	1	.....	.....	.....	.....	.....	.....	.....
Cryptorhynchus	.....	.....	1	.....	.....	.....	.....	.....
Dasyneura	8	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	13
Euura	.....	.....	.....	.....	.....	9	.....	.....
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Oligotrophus	1	.....	.....	.....	.....	.....	.....	.....
Pontania	.....	.....	.....	.....	.....	5	.....	.....
Phytophaga	9	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	23	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Sackenomyia	2	.....	.....	.....	.....	.....	.....	.....
Saperda	.....	.....	1	.....	.....	.....	.....	.....
Populus								
Agromyza	.....	.....	.....	1	.....	.....	.....	.....
Cecidomyia	7	.....	.....	.....	.....	.....	.....	.....
Cryptorhynchus	.....	.....	1	.....	.....	.....	.....	.....
Dicrodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Ectoedemia	.....	.....	.....	.....	.....	.....	1	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	9
Kronomyia	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Pemphigus	.....	.....	.....	.....	6	.....	.....	.....
Mycodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....
Rhizomyia	1	.....	.....	.....	.....	.....	.....	.....
Saperda	.....	.....	1	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonidae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Myricaceae								
Myrica								
Cecidomyia	1							
Eriophyes								1
Janetiella	1							
Juglandaceae	29				29			7
Juglans								
Cecidomyia	1							
Eriophyes								4
Carya								
Caryomyia	20							
Cecidomyia	4							
Eriophyes								3
Miastor	1							
Mycodiplosis	1							
Parallelodiplosis	1							
Phylloxera					29			
Rhabdophaga	1							
Betulaceae	11		3		2			18
Corylus								
Agrilus			1					
Cecidomyia	1							
Eriophyes								1
Lasiopteryx	1							
Mycodiplosis	1							
Ostrya								
Cecidomyia	1							
Eriophyes								1
Carpinus								
Cecidomyia	1							
Betula								
Agrilus			1					
Eriophyes								10
Hamamelistes					1			
Hormaphis					1			
Itonida	1							
Lestodiplosis	1							
Miastor	1							
Mycodiplosis	1							
Oligotrophus	1							
Alnus								
Eriophyes								6
Dasyneura	1							
Saperda			1					
Fagaceae	43	359						17
Fagus								
Eriophyes								4
Castanea								
Cecidomyia	2							
Ectoedemia							1	
Eriophyes								1
Itonida	1							
Janetiella	1							
Miastor	1							
Rhopalomyia	1							
Winnertzia	1							
Castanopsis								
Andricus		1						
Quercus								
Amphibolips		26						
Andricus		114						
Bassettia		1						
Biorhiza		5						
Blenocnema		1						
Callirhytis		41						
Cecidomyia	11							
Cincticornia	12							
Compsodryoxenus		2						
Cynips		36						
Dasyneura	2							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Dicrodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Disholcaspis	.....	27	.....	.....	.....	.....	.....	.....
Dolichostrophus	.....	1	.....	.....	.....	.....	.....	.....
Dryocosmus	.....	1	.....	.....	.....	.....	.....	.....
Dryophanta	.....	41	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	12
Eumayria	.....	1	.....	.....	.....	.....	.....	.....
Itonida	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Loxaulus	.....	3	.....	.....	.....	.....	.....	.....
Leptosyna	1	.....	.....	.....	.....	.....	.....	.....
Miastor	1	.....	.....	.....	.....	.....	.....	.....
Neuroterus	.....	47	.....	.....	.....	.....	.....	.....
Odontocynips	.....	1	.....	.....	.....	.....	.....	.....
Parallelodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Philonix	.....	13	.....	.....	.....	.....	.....	.....
Thecodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Trichoteras	.....	1	.....	.....	.....	.....	.....	.....
Trigonaspis	.....	2	.....	.....	.....	.....	.....	.....
Xystoteras	.....	1	.....	.....	.....	.....	.....	.....
Youngomyia	1	.....	.....	.....	.....	.....	.....	.....
Zopheroteras	.....	1	.....	.....	.....	.....	.....	.....
Urticaceae	18	.....	.....	.....	14	.....	.....	5
Ulmus								
Colopha	.....	.....	.....	.....	1	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	4
Oligarces	1	.....	.....	.....	.....	.....	.....	.....
Pemphigus	.....	.....	.....	.....	1	.....	.....	.....
Phytophaga	2	.....	.....	.....	.....	.....	.....	.....
Tetraneura	.....	.....	.....	.....	1	.....	.....	.....
Schizoneura	.....	.....	.....	.....	2	.....	.....	.....
Celtis								
Cecidomyia	7	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Pachypsylla	.....	.....	.....	.....	9	.....	.....	.....
Phytophaga	2	.....	.....	.....	.....	.....	.....	.....
Humulus								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Urtica								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Laportea								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Boehmeria								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Aristolochiaceae								
Aristolochia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Polygonaceae	5	.....	.....	.....	.....	.....	.....	.....
Eriogonum								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Rumex								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Coccolobis								
Ctenodactylomyia	1	.....	.....	.....	.....	.....	.....	.....
Chenopodiaceae	7	.....	.....	.....	2	.....	.....	.....
Eurotia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Atriplex								
Asphondylia	2	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Coccid	.....	.....	.....	.....	2	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Sarcobatus								
Aplonyx	1	.....	.....	.....	.....	.....	.....	.....
Onodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Protaplonyx	1	.....	.....	.....	.....	.....	.....	.....
Trypetid	.....	.....	.....	1	.....	.....	.....	.....
Suaeda								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Phytolaccaceae								
Rivina								
Schizomyia	1	.....	.....	.....	.....	.....	.....	.....
Nyctaginaceae								
Oxybaphus								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Pisonia								
Feltomyia	3	.....	.....	.....	.....	.....	.....	.....
Ranunculaceae	9	.....	.....	1	.....	.....	.....	2
Thalictrum								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Trotteria	1	.....	.....	.....	.....	.....	.....	.....
Anemone								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Clematis								
Agromyza	.....	.....	.....	1	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Prodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Paeonia								
Joannisia	1	.....	.....	.....	.....	.....	.....	.....
Magnoliaceae								
Liriodendron								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Thecodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Lauraceae								
Sassafras								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Benzoin								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Papaveraceae								
Papaver								
Clinodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Cruciferae								
Lepidium								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Sisymbrium								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Stanleya								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Capparidaceae								
Cleome								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Crassulaceae								
Clementsia	.....	.....	.....	.....	.....	.....	.....	1
Saxifragaceae								
Hydrangea								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Ribes								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Phytophaga	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Hamamelidaceae								
Hamamelis								
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Hormaphis	.....	.....	.....	.....	1	.....	.....	.....
Liquidambar								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Platanaceae								
Platanus								
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Rosaceae	56	38	5	.....	.....	4	.....	27
Exochorda								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Spiraea								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Itonida	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Parallelodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Prodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....
Pyrus								
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	3
Syntomaspis	.....	.....	.....	.....	.....	1	.....	.....
Cercocarpus								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Aronia								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Amelanchier								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	2
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Sorbus								
Eriophyes	.....	.....	.....	.....	.....	1	.....	2
Megastigmus	.....	.....	.....	.....	.....	1	.....	.....
Syntomaspis	.....	.....	.....	.....	.....	.....	.....	.....
Crataegus								
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	4
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Dicrodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Lobopteromyia	1	.....	.....	.....	.....	.....	.....	.....
Rhizomyia	2	.....	.....	.....	.....	.....	.....	.....
Saperda	.....	.....	1	.....	.....	.....	.....	.....
Winnertzia	1	.....	.....	.....	.....	.....	.....	.....
Cotoneaster								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Fragaria								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	1	.....	.....	.....	.....	.....	.....
Potentilla								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	2	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Gonaspis	.....	1	.....	.....	.....	.....	.....	.....
Rubus								
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Camptoneuromyia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	6	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Oberea	.....	.....	1	.....	.....	.....	.....	.....
Rhodites	.....	2	.....	.....	.....	.....	.....	.....
Agrimonia								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Rosa								
Aphidoletes	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	2	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonidae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Rhodites	.....	28	.....	.....	.....	.....	.....	.....
Megastigmus	.....	.....	.....	.....	.....	1	.....	.....
Amygdalus								
Phyllocoptes	.....	.....	.....	.....	.....	.....	.....	1
Prunus								
Arthrocnodax	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	5	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	10
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Mycodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Parallelodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhizomyia	1	.....	.....	.....	.....	.....	.....	.....
Adenostoma								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Leguminosae	*24*	.....	.....	.....	.....	.....	*1*	.....
Prosopis								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Gledits'a								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Cassia								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Thermopsis								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Crotalaria								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Genista								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Lupinus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Trifolium								
Dasyneura	2	.....	.....	.....	.....	.....	.....	.....
Medicago								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Robinia								
Ecdytolopha	.....	.....	.....	.....	.....	.....	1	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Obolodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Desmodium								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lespedeza								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Lathyrus								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Amphicarpa								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Geraniaceae								
Geranium								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Zygophyllaceae								
Covillea								
Asphondylia	2	.....	.....	.....	.....	.....	.....	.....
Rutaceae								
Citrus								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Phyllocoptes	.....	.....	.....	.....	.....	.....	.....	2
Euphorbiaceae	*5*	.....	.....	.....	.....	.....	.....	*1*
Manihot								
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Lasiopteryx	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Acalypha								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Phyllanthus								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Euphorbia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Buxaceae								
Buxus								
Monarthropalpus	1	.....	.....	.....	.....	.....	.....	.....
Anacardiaceae	7	.....	.....	.....	1	1	.....	3
Mangifera								
Asynapta	1	.....	.....	.....	.....	.....	.....	.....
Erosomyia	1	.....	.....	.....	.....	.....	.....	.....
Rhus								
Arthrocnodax	1	.....	.....	.....	.....	.....	.....	.....
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	3
Eurytoma	.....	.....	.....	.....	1	.....	.....	.....
Parallelodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Pemphigus	.....	.....	.....	.....	1	.....	.....	.....
Aquifoliaceae								
Nemopanthus								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Celastraceae								
Pachistima								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Celastrus								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Aceraceae	13	.....	.....	.....	.....	.....	1	34
Acer								
Anthocoptes	.....	.....	.....	.....	.....	.....	.....	1
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	3	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	20
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Miastor	1	.....	.....	.....	.....	.....	.....	.....
Phyllocoptes	.....	.....	.....	.....	.....	.....	.....	13
Rhabdophaga	2	.....	.....	.....	.....	.....	.....	.....
Sesia	.....	.....	.....	.....	.....	.....	1	.....
Winnertzia	1	.....	.....	.....	.....	.....	.....	.....
Balsaminaceae								
Impatiens								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Mycodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhamnaceae								
Ceanothus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Stagmatophora	.....	.....	.....	.....	.....	.....	1	.....
Vitaceae	22	.....	1	.....	1	3	1	7
Psedera								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Prodecatoma	.....	.....	.....	.....	.....	1	.....	.....
Vitis								
Ampeloglypter	.....	.....	1	.....	.....	.....	.....	.....
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Brachyneura	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	4	.....	.....	.....	.....	.....	.....	.....
Coleophora	.....	.....	.....	.....	.....	.....	1	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Decatomidea	.....	.....	.....	.....	.....	1	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	6

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonidae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Evoxysoma	.....	.....	.....	.....	.....	1	.....	.....
Janetiella	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Lasiopteryx	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Phylloxera	.....	.....	.....	.....	1	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....
Rhizomyia	1	.....	.....	.....	.....	.....	.....	.....
Schizomyia	3	.....	.....	.....	.....	.....	.....	.....
Cissus								
Astrodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Tiliaceae								
Tilia								
Agromyza	.....	.....	.....	1	.....	.....	.....	.....
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Colpodia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Porricondyla	1	.....	.....	.....	.....	.....	.....	.....
Malvaceae								
Gossypium								
Arthrocnodax	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Porricondyla	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Hibiscus								
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Hypericaceae								
Hypericum								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Violaceae								
Viola								
Arthrocnodax	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Phytophaga	1	.....	.....	.....	.....	.....	.....	.....
Loasaceae								
Mentzelia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cactaceae								
Optunia								
Asphondylia	3	.....	.....	.....	.....	.....	.....	.....
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Elaeagnaceae								
Shepherdia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Lythraceae								
Decodon								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Myrtaceae								
Eugenia								
Cystodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Onagraceae								
Zauschneria								
Thecodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Umbelliferae								
Cicuta								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Zizia								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Cornaceae	9	.....	.....	.....	.....	.....	.....	3
Garrya								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cornus								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Nyssa								
Cecidomyia	2							
Eriophyes								
Ericaceae								
Rhododendron								
Asphondylia	1							
Gaylussacia								
Cecidomyia	1							
Vaccinium								
Dasyneura	3							
Eriophyes								1
Lasioptera	1							
Solenozopheria		1						
Primulaceae								
Lysimachia								
Dasyneura	1							
Lestremia	1							
Sapotaceae								
Bumelia								
Asphondylia	1							
Ebenaceae								
Diospyros								
Eriophyes								1
Oleaceae	10				1			5
Fraxinus								
Cecidomyia	1							
Contarinia	1							
Colpodia	1							
Dasyneura	3							
Eriophyes								5
Lasioptera	1							
Lestodiplosis	1							
Phytophaga	1							
Psyllopsis					1			
Rhizomyia	1							
Apocynaceae								
Apocynum								
Itonida	1							
Lestodiplosis	1							
Asclepiadaceae								
Asclepias								
Cecidomyia	2							
Lestodiplosis	1							
Neolasioptera	1							
Convolvulaceae								
Ipomoea								
Camptoneuromyia	1							
Schizomyia	1							
Convolvulus								
Lasioptera	1							
Boraginaceae								
Amsinckia								
Schizomyia	1							
Verbenaceae	7							1
Verbena								
Cecidomyia	2							
Lasioptera	1							
Lestodiplosis	1							
Eriophyes								1
Clerodendron								
Asphondylia	1							
Stachytarpha								
Hyperdiplosis	1							
Labiatae	14	1					1	
Audibertia								
Rhopalomyia	1							
Trichostema								
Stagmatophora							1	
Scutellaria								
Cecidomyia	1							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Nepeta								
Aylax	.....	1	.....	.....	.....	.....	.....	.....
Galeopsis								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Salvia								
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Monarda								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Lycopus								
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Mentha								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	2	.....	.....	.....	.....	.....	.....	.....
Giardomyia	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Collinsonia								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Solanaceae								
Lycopersicum								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Solanum								
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Scrophulariaceae	6	.....	.....	.....	.....	.....	.....	1
Scrophularia								
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Pentstemon								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Mimulus								
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Diplacus								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Gerardia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Bignoniaceae								
Tecoma								
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Catalpa								
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Plantaginaceae								
Plantago								
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rubiaceae								
Galium								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Cephalanthus								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	2
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....
Caprifoliaceae	17	.....	.....	.....	.....	.....	.....	3
Diervilla								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lonicera								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Symphoricarpos								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Thomasia	1	.....	.....	.....	.....	.....	.....	.....
Viburnum								
Cecidomyia	5	.....	.....	.....	.....	.....	.....	.....
Cystiphora	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	2
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Sackenomyia	1	.....	.....	.....	.....	.....	.....	.....
Schizomyia	1	.....	.....	.....	.....	.....	.....	.....
Sambucus								
Arthrocnodax	1	.....	.....	.....	.....	.....	.....	.....
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Youngomyia	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Cucurbitaceae								
Cucumeris								
Aphidoletes	1	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Compositae	151	12	.....	8	.....	.....	8	3
Vernonia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Youngomyia	1	.....	.....	.....	.....	.....	.....	.....
Eupatorium								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Brachyneura	1	.....	.....	.....	.....	.....	.....	.....
Clinorhyncha	1	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	2	.....	.....	.....	.....	.....	.....	.....
Mikania								
Trypetid	.....	.....	.....	1	.....	.....	.....	.....
Grindelia								
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Gutierrezia								
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Chrysopsis								
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Solidago								
Asphondylia	2	.....	.....	.....	.....	.....	.....	.....
Asteromyia	9	.....	.....	.....	.....	.....	.....	.....
Camptoneuromyia	3	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	3	.....	.....	.....	.....	.....	.....	.....
Dryomyia	1	.....	.....	.....	.....	.....	.....	.....
Eucosma	.....	.....	.....	.....	.....	.....	1	.....
Eurosta	.....	.....	.....	2	.....	.....	.....	.....
Eutreta	.....	.....	.....	1	.....	.....	.....	.....
Gnorimoschema	.....	.....	.....	.....	.....	.....	4	.....
Lasioptera	3	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	4	.....	.....	.....	.....	.....	.....	.....
Oedaspis	.....	.....	.....	1	.....	.....	.....	.....
Oligotrophus	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	16	.....	.....	.....	.....	.....	.....	.....
Trotteria	1	.....	.....	.....	.....	.....	.....	.....
Bigelovia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Asteromyia	2	.....	.....	.....	.....	.....	.....	.....
Aylax	.....	1	.....	.....	.....	.....	.....	.....
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eurosta	.....	.....	.....	1	.....	.....	.....	.....
Rhopalomyia	5	.....	.....	.....	.....	.....	.....	.....
Aster								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Asteromyia	13	.....	.....	.....	.....	.....	.....	.....
Gnorimoschema	.....	.....	.....	.....	.....	.....	3	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	2	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	5	.....	.....	.....	.....	.....	.....	.....
Acamptopappus								
Gnorimoschema	.....	.....	.....	.....	.....	.....	1	.....
Erigeron								
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Sericocarpus								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Baccharis								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (concluded)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Gnorimoschema	.....	.....	.....	.....	.....	.....	1	.....
Rhopalomyia	3	.....	.....	.....	.....	.....	.....	.....
Ericameria								
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Antennaria								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	2	.....	.....	.....	.....	.....	.....	.....
Gnaphalium								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Silphium								
Aylax	.....	4	.....	.....	.....	.....	.....	.....
Parthenium								
Paradiplosis	1	.....	.....	.....	.....	.....	.....	.....
Iva								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Ambrosia								
Aulacidea	.....	1	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Rudbeckia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lepachys								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Helianthus								
Asphondylia	3	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Hormomyia	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	2	.....	.....	.....	.....	.....	.....	.....
Actinomeris								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Helenium								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Achillea								
Clinorhyncha	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Anthemis								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Chrysanthemum								
Diarthronomyia	1	.....	.....	.....	.....	.....	.....	.....
Artemisia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Diarthronomyia	4	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	2
Rhopalomyia	7	.....	.....	.....	.....	.....	.....	.....
Trypetid	.....	.....	.....	3	.....	.....	.....	.....
Senecio								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Arctium								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Taraxacum								
Aylax	.....	1	.....	.....	.....	.....	.....	.....
Lactuca								
Aulacidea	.....	3	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Sonchus								
Aulacidea	.....	1	.....	.....	.....	.....	.....	.....
Encelia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Lygodesmia								
Aylax	.....	1	.....	.....	.....	.....	.....	.....
Prenanthes								
Aulacidea	.....	1	.....	.....	.....	.....	.....	.....
Cystiphora	1	.....	.....	.....	.....	.....	.....	.....
Total species	682	445	12	18	61	44	17	162

Synopsis of American Gall Makers

DIPTERA

Itonididae	
Allomyia	1
Aphidoletes	2
Aplonyx	1
Arthrocnodax	6
Asphondylia	40
Asteromyia	27
Astrodiplosis	1
Asynapta	2
Brachyneura	2
Camptomyia	1
Camptoneuromyia	4
Caryomyia	17
Cecidomyia	153
Cincticornia	11
Clinodiplosis	1
Clinorhyncha	3
Colpodia	4
Contarinia	15
Coquillettomyia	1
Ctenodactylomyia	1
Cystiphora	2
Cystodiplosis	1
Dasyneura	61
Diarthronomyia	5
Dicrodiplosis	4
Dryomyia	1
Erosomyia	1
Feltomyia	3
Giardomyia	1
Hormomyia	7
Hyperdiplosis	1
Itonida	16
Janetiella	5
Joannisia	1
Kronomyia	1
Lasioptera	52
Lasiopteryx	3
Leptosyna	1

HYMENOPTERA

Cynipidae	
Amphibolips	28
Andricus	125
Aulacidea	6
Aylax	10
Bassettia	1
Biorhiza	4
Blenocnema	1
Callirhytis	43
Chilaspis	1
Compsodryoxenus	2
Cynips	39
Diastrophus	10
Disholcaspis	30
Dolichostrophus	1
Dryocosmus	1
Dryophanta	42
Eumayria	1
Gonaspis	1
Holocynips	1
Loxaulus	3
Neuroterus	43
Odontocynips	1
Phamacis	1
Philonix	13
Rhodites	29
Solenozopheria	1
Trichoteras	1
Trigonaspis	2
Trissandricus	1
Xystoteras	1
Zopheroteras	1
	444
Tenthredinidae	
Euura	9
Pontania	5
	14

COLEOPTERA

Buprestidae	
Agrilus	4
Cerambycidae	
Oberea	1
Saperda	4
Cucurlionidae	
Ampeloglypter	1
Cryptorhynchus	1
Podapion	1
	12

LEPIDOPTERA

Sesiidae	
Sesia	1
Tortricidae	
Ecdytolopha	1
Eucosma	1
Proteoteras	1
	3
Gelechidae	
Gnorimoschema	8
Elachistidae	
Coleophora	1
Stagmatophora	2
	3
Tineidae	
Ectoedemia	2

HEMIPTERA

Aphididae	
Chermes	3
Colopha	1
Hamamelistes	1
Hormaphis	1
Pemphigus	7
Phylloxera	31
Schizoneura	2
Tetraneura	1
	47
Psyllidae	
Livia	1
Pachypsylla	9
Psyllopsis	1
	11
Coccidae	
Coccids	2

ERIOPHYIDAE

Anthocoptes	1
Eriophyes	150
Phyllocoptes	10
Siteroptes	1
	162

Synopsis of American Gall Makers — (continued)

DIPTERA		HYMENOPTERA		COLEOPTERA	LEPIDOPTERA	HEMIPTERA	ERIOPHYIDAE
Lestodiplosis	31	*Cephidae*					
Lestremia	1	Cephus	2				
Lobopteromyia	1						
Miastor	1	*Eurytomidae*					
Monardia	2	Decatomidae	1				
Monarthropalpus	1	Eurytoma	1				
Mycodiplosis	7	Eurytomacharis	2				
Neolasioptera	21	Evoxysoma	1				
Obolodiplosis	1	Isosoma	16				
Oligarces	1	Isomorpha	1				
Oligotrophus	4	Prodecatoma	1				
Onodiplosis	1		23				
Paradiplosis	1	*Chalcididae*					
Parallelodiplosis	8	Chalcid	1				
Phytophaga	16						
Porricondyla	2	*Torymidae*					
Prionellus	1	Megastigmus	3				
Prodiplosis	2	Syntomaspis	1				
Protaplonyx	1		4				
Retinodiplosis	7						
Rhabdophaga	30						
Rhizomyia	4						
Rhopalomyia	50						
Sackenomyia	3						
Schizomyia	7						
Thecodiplosis	7						
Thomasia	1						
Trotteria	2						
Walshomyia	2						
Winnertzia	4						
Youngomyia	3						
	682						
Trypetidae							
Eurosta	3						
Eutreta	1						
Oedaspis	1						
Trypetid	5						
	10						

| | | |

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1918b ——— Notes and descriptions of Itonididae in the collections of the American Museum of Natural History. Amer. Mus. Nat. Hist. V. 38, Art. 6, p. 179–82
1918c ——— Gall insects and their relation to plants. Sci. Mon. 6:509–525
1918d ——— New Gall Midges. Econ. Ent. Jour. 11:380–84
1918 **Malloch, J. R.** Anthracophaga distichliae sp. n. Econ. Ent. Jour. 11:361–62

Explanation of Plates

Plate I

Cynipid Galls

1 Gall on oak, of Andricus cicatriculus Bass. (After Thompson)
2 Gall on oak, of Andricus flocci Walsh. (After Thompson)
3 Leafy oak gall, Andricus foliatus Ashm. (After Weld)
4 Oak wool gall, Andricus lana Fitch. (After Thompson)
5 Gall on oak, of Andricus ostensackeni Bass. (After Thompson)
6 Gall on oak, of Andricus piperoides Bass. (After Thompson)
7 Gall on oak, of Andricus perditor Bass. (After Thompson)
8 Galls on oak, of Andricus ventricosus Bass. Single gall and a typical cluster. (After Stebbins)
9 Horned oak gall, Andricus cornigerus O. S. on pin oak, Q. palustris

Plate 1

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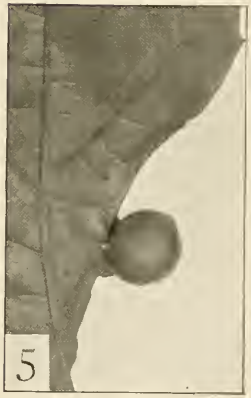
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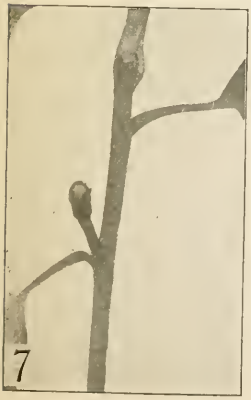
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Plate 2

Cynipid Galls

1 Gall on oak, of Andricus rileyi Ashm. (After Thompson)
2 White oak club gall, Andricus clavula O. S. (After Thompson)
3 Oak wart gall, Andricus futilis Bass. (After Thompson)
4 Gall on oak, of Andricus operator O. S. Spring form. (After Thompson)
5 Gall on oak, of Andricus operator O. S. Fall form. (After Thompson)
6 Oak nipple gall, Andricus papillatus O. S. (After Thompson)
7 Oak flower gall, Callirhytis pulchra Bass. (After Thompson)
8 Gall on oak, of Andricus scitula Bass. (After Thompson)
9 Scrub oak club gall, Callirhytis similis Bass. (After Thompson)

Plate 2

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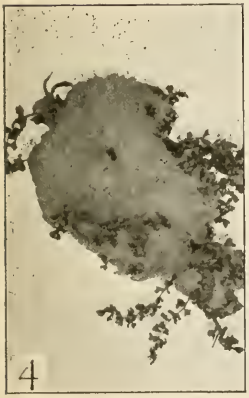
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Plate 3

Insect Galls

1 Oak leaf seed gall, Cynips decidua Bass. (After Thompson)
2 Gall on oak, Andricus formosa Bass. (After Weld)
3 Oak rosette gall, Cynips frondosa Bass. (After Thompson)
4 Gall on oak, of Cynips glandulosus Riley. (After Thompson)
5 Lobed oak gall, Cynips strobilana O. S.
6 Gall on oak, of Aulacidea podagrae Bass. (After Thompson)
7 Willow egg gall, Euura ovum Walsh. (After Thompson)
8 Gall on oak, of Pontania desmodioides Walsh. (After Thompson)
9 Willow apple gall, Pontania pomum Walsh. (After Thompson)

Plate 3

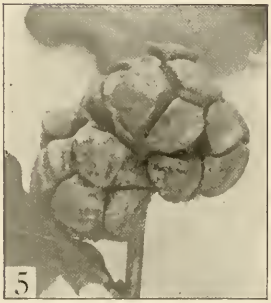

Plate 4

Insect Galls

1 Dipterous gall, probably Agromyza on Clematis. (After Thompson)
2 Iris leaf gall, Agromyza laterella Zett. (After Thompson)
3 Poplar twig gall, Agromyza schineri Giraud
4 Gall on Solidago, of Eurosta reticulata Snow. (After Thompson)
5 Gall of Eutreta sparsa Wied. (After Thompson)
6 Wheat sheath joint worm, Isosoma vaginicolum Doare. (After Doane)
7 Locust twig gall, Ecdytolopha inscitiana Zell. (After Thompson)
8 Scarred goldenrod gall, Eucosma scudderiana Clem. (After Thompson)
9 Irregular, subglobose grape leaf gall, showing a slight swelling on the upper surface and a globose enlargement beneath. ?Coleophora sp. (After Clarke)

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Plate 5

Midge Galls

1 Ash leaves inhabited by Arthrocnodax sambucifolia Felt, the deformation probably produced by a mite, Eriophyes sp. (After Thompson)
2 Cone-flower gall, Asphondylia conspicua O. S.
3 Sunflower purse gall, Asphondylia globulus O. S. (After Weld)
4 Adherent capsule gall on Solidago, inhabited by the nun midge, Asphondylia monacha O. S. and Camptoneuromyia adhesa Felt
5 Gall of nun midge, Asphondylia monacha O. S., on narrow-leaved goldenrod
6 Cactus infested by Asphondylia opuntiae Felt. (After Essig)
7 Gall of Asteromyia sp. on Ionactis linearifolius. (After Clarke)
8 Blister gall of ? Caryomyia species on hickory
9 Gall of spruce bud midge, Rhabdophaga swainei Felt. (After Swaine)

Plate 5

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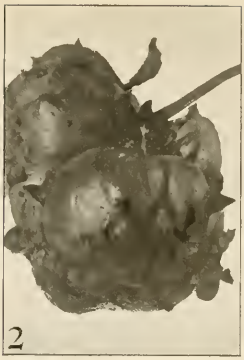
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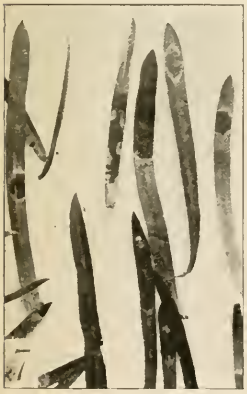
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Plate 6

Midge Galls

1 Gall on hickory, of Caryomyia antennata Felt. (After Thompson)
2 Hickory seed gall, Caryomyia caryaecola O. S.
3 Hickory seed gall, Caryomyia "caryaecola O. S." Another type. (After Stebbins)
4 Hickory onion gall, Caryomyia holotricha O. S. (After Thompson)
5 Gall on hickory, of Caryomyia sp.
6 Gall on hickory, of Caryomyia sp. (After Thompson)
7 Hickory leaf gall, Caryomyia caryae O. S.
8 Gall on hickory, of Caryomyia thompsoni Felt. (After Thompson)
9 Gall on hickory, of Caryomyia consobrina Felt. (After Clarke)

Plate 6

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Plate 7

Midge Galls

1 Balsam gall midge, Cecidomyia balsamicola Lintn. (After Thompson)
2 Gall of Cecidomyia sp., on balm of Gilead
3 Hazel catkin gall, Cecidomyia squamulicola Stebb.
4 Touch-me-not gall, Cecidomyia impatientis O. S. (After Thompson)
5 Gall on cherry racemes produced by Cecidomyia racemi Stebb. (After Stebbins)
6 Wild cherry bud gall, Cecidomyia serotinae O. S. (After Clarke)
7 Smilax blister, Camptoneuromyia rubifolia Felt.
8 Nettle bullet gall, Cecidomyia sp. on Urtica. (After Weld)
9 Linden wart gall, Cecidomyia verrucicola O. S., young galls. (After Thompson)

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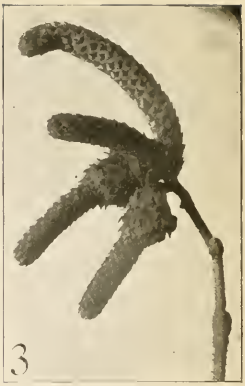
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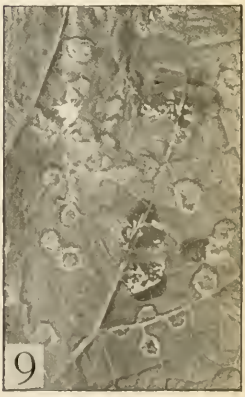
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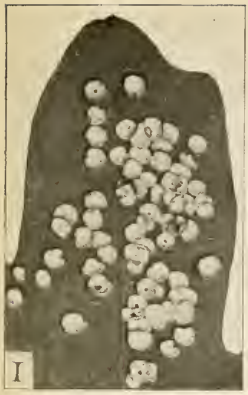
Plate 8

Midge Galls

1 Oak spangles, Cecidomyia poculum O. S. (After Thompson)
2 Probably the same as figure 1. (After Weld)
3 Vein pocket gall, Parallelodiplosis florida Felt, on oak. (After Clarke)
4 Oak gall of Cecidomyia, adult unknown. Resembling much that of Neuroterus niger Gill. (After Clarke)
5 Marginal fold gall of Itonida foliora Rssl. & Hkr., on oak. (After Clarke)
6 Oak leaves with lobes folded by Cecidomyia sp., adult unknown. (After Clarke)
7 Oak blister midge, Cincticornia pustulata Felt. (After Clarke)
8 Oak leaf showing galls of Cincticornia sp., possibly C. simpla Felt.
9 Purple oak vein gall, Cincticornia podagrae Felt.

Plate 8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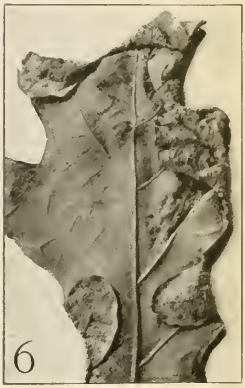
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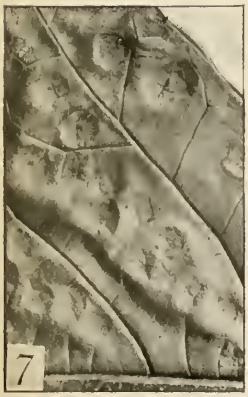
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Plate 9

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Midge Galls

1 Subglobose vein gall on oak, produced by Cecidomyia sp., adult unknown
2 Gall on oak, of Cincticornia majalis O. S. (After Thompson)
3 Oak pill gall, Cincticornia pilula? Walsh. (After Thompson)
4 Clematis bud gall, Contarinia clematidis Felt. (After Thompson)
5 Grape blister gall, Cecidomyia species. (After Weld)
6 Chokecherry midge, Contarinia virginianiae Felt. (After Thompson)
7 Arrow-wood blister midge, Cystiphora viburnifolia Felt. (After Clarke)
8 Honey locust pod gall, Dasyneura gleditschiae O. S. (After Clarke)
9 Loosestrife bud gall, Dasyneura lysimachiae Beutm. (After Clarke)

Plate 10

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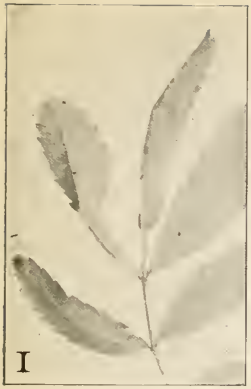
Midge Galls

1 Rose leaf midge, Dasyneura ?rosarum Hardy. (After Thompson)
2 Willow pod midge, Dasyneura salicifolia Felt. (After Clarke)
3 Elm buds blasted by Dasyneura ulmea Felt. (After Houser)
4 Galls of Chrysanthemum midge, Diarthronomyia hypogaea H. Lw.
5 Sunflower bullet gall, Hormomyia bulla Felt. (After Weld)
6 Willow lipped gall, Hormomyia verruca Walsh. (After Clarke)
7 Tulip spot gall, Thecodiplosis liriodendri O. S. (After Thompson)
8 Gall on Impatiens, of Lasioptera impatientifolia Felt. (After Thompson)
9 Thorn vein gall, Lobopteromyia venae Felt. (After Thompson)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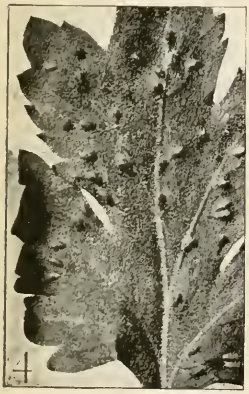
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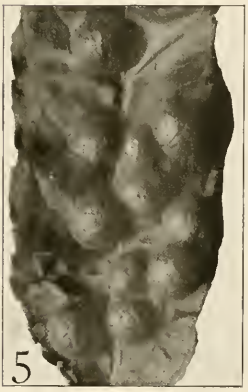
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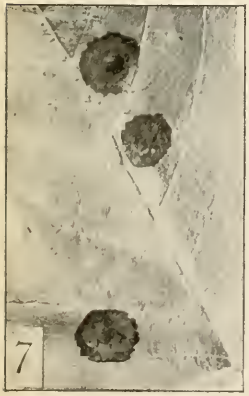
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Plate 11

Midge Galls

1 White snake root flower buds from which was reared Lestodiplosis eupatorii Felt.
2 Gall of Crataegus leaf from which was reared Lestodiplosis crataegifolia Felt. This midge is probably predaceous. (After Thompson)
3 Gall on Crataegus leaf from which was reared Lestodiplosis crataegifolia Felt. (After Thompson)
4 Cherry leaf from which was reared Mycodiplosis cerasifolia Felt. (After Thompson)
5 Beaked willow gall, Phytophaga rigidae O. S.
6 Elm leaves deformed by Phytophaga ulmi Beutm. (After Thompson)
7 Willow cabbage gall, Rhabdophaga brassicoides Walsh.
8 Willow twig showing deformation, provisionally referred to Rhabdophaga globosa Felt.
9 Nodule willow gall, Rhabdophaga nodula Walsh.

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Plate 12

Midge Galls

2 Spiraea pod gall, Rhabdophaga salicifolia Felt. (After Thompson)
1 Willow twig deformed by Rhabdophaga salicis Schr.
3 Willow tips showing blasted apical buds, the work of Cecidomyia sp., adult unknown.
4 Wheat ear gall, Rhabdophaga triticoides Walsh, on willow.
5 Downy flower gall, Rhopalomyia anthophila O. S. (After Weld)
6 Beaked flower gall, Rhopalomyia racemicola O. S. (After Weld)
7 Solidago showing subterranean bud galls of Rhopalomyia bulbula Felt. (After Thompson)
8 Galls of gooseberry bud midge, Rhopalomyia grossulariae Felt. (After Houser)
9 Root stalk bud midge, Rhopalomyia hirtipes O. S. (After Stebbins)

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Plate 13

Midge Galls

1 White flowered aster buds deformed by Rhopalomyia lateriflori Felt. (After Clarke)

2 Goldenrod bunch gall, Rhopalomyia solidaginis Lw.

3 Flower bud galls of Aster undulatus, deformed by Rhopalomyia sp. (After Clarke)

4 Subterranean galls on Solidago inhabited by Rhopalomyia thompsoni Felt. (After Thompson)

5 Gall on arrow-wood leaves produced by the purple vein midge, Sackenomyia viburnifolia Felt.

6 Grape filbert gall, Schizomyia coryloides Walsh & Riley. (After Weld)

7 Gall of elder flower midge, Youngomyia umbellicola O. S. (After Weld)

8 Gall on oak leaves produced by Cincticornia globosa Felt. (After Clarke)

Dogwood spot gall, Lasioptera corni Felt. (After Clarke)

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Plate 14

Plant Galls

1 Long spruce cone gall, Chermes cooleyi Gill.
2 Hackberry nipple gall, Pachypsylla mamma Riley. (After Thompson)
3 Red pouch gall, Pemphigus rhois Fitch. (Author's illustration)
4 Hickory leaf gall produced by Phylloxera caryae-avellana Riley. (After Thompson)
5 Hickory leaf gall produced by Phylloxera caryaefallax Riley. (After Thompson)
6 Hickory leaf gall produced by Phylloxera caryaeglobuli Walsh. (After Thompson)
7 Hickory leaf gall produced by Phylloxera rimosalis Perg. (After Thompson)
8 Hickory leaf gall produced by Phylloxera caryaesemen Walsh. (After Thompson)
9 Axillary Spiraea bud galls infested by Cecidomyia sp. (After Clarke)

Plate 14

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Plate 15

Plant Mite Galls

1 Alder leaf galls produced by a plant mite, Eriophyes sp. (After Thompson)
2 Bud galls on yellow birch produced by a plant mite, Eriophyes sp.
3 Foliage deformed by ash Psyllid, Psyllopsis fraxinicola Forst. (Author's illustration)
4 Hickory leaves with margins inrolled by Eriophyes sp. (After Thompson)
5 Hazel or Corylus buds deformed by Eriophyes sp. (After Thompson)
6 Bayberry leaves badly deformed by Eriophyes sp. (After Thompson)
7 Beech leaves affected by Eriophyes sp. (After Thompson)
8 Ash leaves showing numerous galls of Eriophyes fraxini Garm. (After Thompson)
9 Ash flower gall, Eriophyes fraxiniflorae Felt. (After Thompson)

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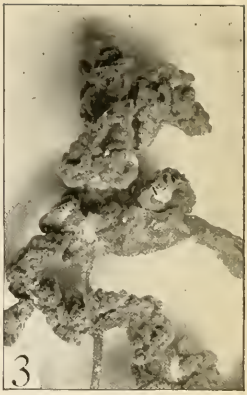
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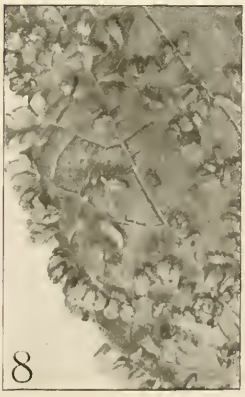
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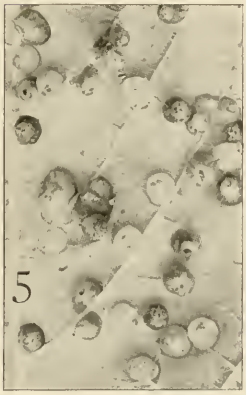
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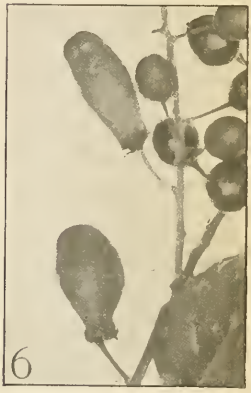
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Plate 16

Plant Mite Galls

1 Eriophyes sp. on red maple, Acer rubrum. (After Thompson)
2 Wild cherry pouch gall, Eriophyes ?padi Nal. (After Thompson)
3 Poplar leaves deformed possibly by Eriophyes populi Nal. (After Thompson)
4 Leaf gall on Pyrus arbutifolia, produced by Eriophyes sp. (After Thompson)
5 Oak buds blasted by Eriophyes sp. (After Thompson)
6 Galls on poison ivy produced by Eriophyes sp. (After Thompson)
7 Terminal leaves of Rhus copallina deformed by Eriophyes sp. (After Thompson)
8 Willow leaf gall produced by Eriophyes sp. (After Thompson)
9 Maple bladder gall, Phyllocoptes quadripes Shim.

Plate 16

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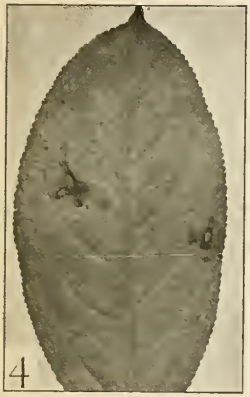
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